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1911-1912

BIENNIAL REPORT
OF THE
STATE
INSPECTOR OF COAL MINES
COLORADO

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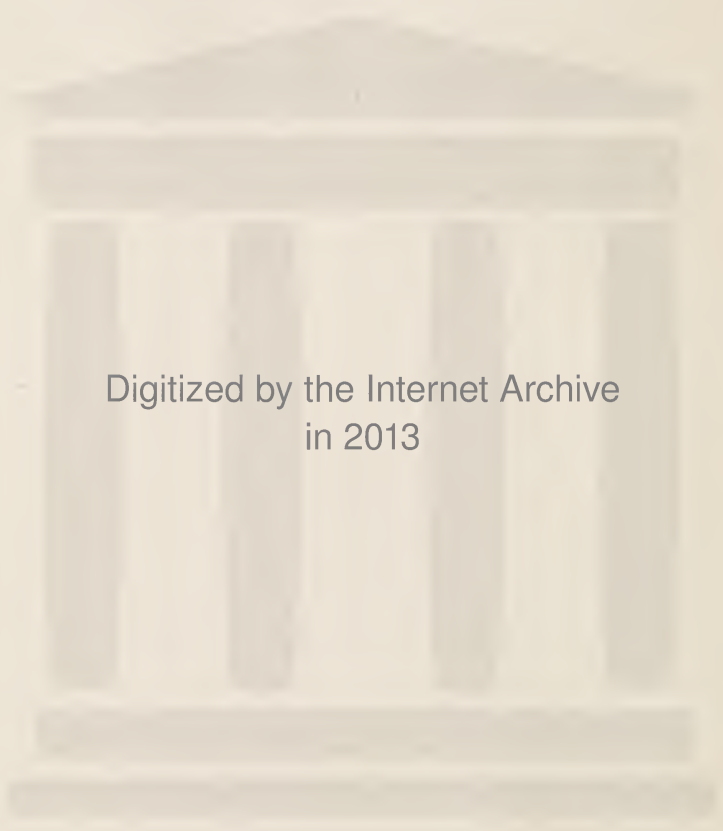
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Fifteenth Biennial Report

OF THE

State Inspector of Coal Mines

Compliments of

JAMES DALRYMPLE

State Inspector of Coal Mines, Colorado



DENVER, COLORADO
THE SMITH-BROOKS PRINTING CO., STATE PRINTERS
1913

NOTICE

Copies of the Mining Law and of this Biennial Report may be obtained by addressing this department.

PERSONNEL OF THE STATE COAL MINING DEPARTMENT

JAMES DALRYMPLE.....Chief Inspector
Denver, Colorado

FRANK N. OBERDING.....Deputy Inspector
Louisville, Colorado

HENRY P. KING.....Deputy Inspector
Denver, Colorado

JAMES W. GRAHAM.....Deputy Inspector
Lafayette, Colorado

DOROTHY GUNN.....Clerk
Denver, Colorado

LETTER OF TRANSMITTAL

HON. ELIAS M. AMMONS,
Governor of Colorado.

Sir: In compliance with section 17 of an act entitled "Coal Mines," I have the honor of submitting to you the Fifteenth Biennial Report of this department, covering the two years ending December 31, 1912, giving the annual production by mines and by counties, a list of the fatal accidents, the number of non-fatal accidents and their causes, the number of persons employed, the number of mines in operation, new mines opened up, and improvements made in some of the older mines.

Respectfully submitted,

JAMES DALRYMPLE,
State Inspector of Coal Mines.

SUMMARY OF THE COAL PRODUCTION OF COLORADO IN 1911 AND 1912

	1911	1912
Number of mines in operation.....	164	160
Number of new mines opened.....	5	5
Number of old mines reopened.....	11	5
Number of mines closed or abandoned.....	14	5
Tons of lignite coal produced.....	1,766,353	1,967,797
Tons of semi-bituminous coal produced.....	758,587	922,552
Tons of bituminous coal produced.....	7,538,657	7,982,562
Tons of anthracite coal produced.....	63,998	69,037
Tons of unclassified coal produced (estimated).....	70,000	75,000
Total number of tons produced.....	10,197,595	11,016,948
Increase, 1912		819,353
Tons of coal mined by hand.....	9,998,702.67	8,751,979.42
Tons of coal mined by machines.....	1,198,892.33	2,264,968.58
Total number of mining machines used.....	241	320
Total number of tons of coke produced.....	937,952	972,539
Total number of coke ovens in operation.....	2,464	1,751
Total number of employes in and about the mines.....	14,315.2	13,980.6
Total number of employes at the coke ovens.....	952	674
Average number of days worked for all producing mines	173.8	191.7
Number of men killed, underground.....	86	95
Number of men killed, surface.....	5	3
Number of men injured.....	305	356
Tons of coal mined to each life lost.....	122,862.2	112,417.84
Tons of coal mined to each man injured.....	33,434.73	30,946.46
Number of killed per 1,000 employes.....	6.35	7.055
Number of injured per 1,000 employes.....	21.3	25.6
Number of employes to each life lost.....	166.45	142.66
Number of employes to each man injured.....	46.9	39.3
Number of widows left.....	43	51
Number of children left fatherless.....	114	134

The Fifteenth Biennial Report

OF THE

State Inspector of Coal Mines

ERRATA

Pages 18 and 19. Second line from top should have the year "1911" added.

Page 37. Last paragraph should be placed at the top of page 38.

Page 86. Head page "Mine Fires" and change heading "Mine Fires" to "Monarch No. 1 Mine".

Page 96. Last paragraph, change to top of page 97.

Page 117. Readings taken at Crested Butte mine should have head line of "Relative Humidity".

Our means of producing has grown much more rapidly than the demand. I do not anticipate any material increase in the production in the near future, unless new manufacturing industries start up, either in Colorado or some of the States adjoining us on the east.

NUMBER EMPLOYED

In 1911 there were 14,315.2 people employed in and around the coal mines; in 1912 there were 13,980.6.

NEW MINES AND OLD MINES REOPENED

During the biennial period ten new mines were opened and sixteen old mines reopened, and considerable improvements were made in some of the older mines.

MINES CLOSED OR ABANDONED

In the two years nineteen mines were abandoned.

SHORTAGE OF CARS

The usual shortage of cars prevailed during the fall and early winter of both years, but in 1912 the shortage was the

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Tons of bituminous coal produced.....	- -	- -
Tons of anthracite.....	- -	- -
Number of men killed, underground.....	173.8	191.7
Number of men killed, surface.....	86	95
Number of men killed, total.....	5	3
Number of men injured.....	305	356
Tons of coal mined to each life lost.....	122,862.2	112,417.84
Tons of coal mined to each man injured.....	33,434.73	30,946.46
Number of killed per 1,000 employees.....	6.35	7.055
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The Fifteenth Biennial Report

OF THE

State Inspector of Coal Mines

1911-1912

INTRODUCTION

The coal industry of Colorado for the two years just passed, as compared with that of 1909-1910, shows a decrease in production of 1,692,520 tons. The principal reason for this decrease was the abnormal demand for Colorado coal in 1910, during labor troubles in some of the other coal-producing states, and the adverse financial conditions in 1911. The production in 1911 was 10,127,595 short tons; in 1912 it was 11,016,948 short tons; making a total production for the biennial period of 21,214,543 short tons.

Our means of producing has grown much more rapidly than the demand. I do not anticipate any material increase in the production in the near future, unless new manufacturing industries start up, either in Colorado or some of the States adjoining us on the east.

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SHORTAGE OF CARS

The usual shortage of cars prevailed during the fall and early winter of both years, but in 1912 the shortage was the

worst the state has ever experienced, which was due to the bountiful crops throughout the country.

FATALITIES

In 1911 ninety-one (91) lives were lost, and two deaths occurred from natural causes. Three hundred and five (305) people were injured. One mine disaster occurred—the dust explosion at the Cokedale mine, where seventeen (17) men lost their lives.

In 1912 ninety-eight (98) lives were lost and three hundred and fifty-six (356) persons were injured. One mine disaster occurred—the gas explosion at the Hastings mine, where twelve (12) men met their death.

AVOIDABLE ACCIDENTS

On January 1, 1913, I requested the deputy inspectors, while investigating fatal accidents, to form an opinion, based upon their own observations, as to whether or not the accidents were avoidable. In going over the reports of fatalities made by the deputies and myself, our opinion is that over 50 per cent of all the fatal accidents were avoidable. This is especially so with the accidents from falls of rock and coal.

In the majority of accidents the deceased or injured person is held responsible, because of negligence on his part. I do not agree with this, because I believe incompetence, and not negligence, is the cause, and the person who is so incompetent that he knows practically nothing about the business in which he is engaged, and is unable to understand what is being said to him by those in charge, should not be held responsible for any accident to himself or others through his actions.

The responsibility in preventing accidents is about equally divided between the official in charge and the individual worker. And in order to reduce accidents to the minimum, it is necessary that the official have the co-operation of the worker and that the worker have the co-operation of the official, so that the co-operation existing will be proportionate to the competency of all concerned. In any case, where the worker or the official is entirely incompetent no co-operation can exist.

This being the case, it is very desirable that competent men be employed as workers and officials, and this can be accomplished by compelling the incompetent workman to serve an apprenticeship under the supervision of a competent person, and by compelling the official to successfully pass a practical and technical examination.

INSTALLATION OF RADIATORS

In September, 1911, this department recommended the installation of radiators and the injecting of steam into the intake air at all mines south of Aguilar, known as the coking coal mines.

In less than three months the Colorado Fuel and Iron Company had complied with the recommendation. It was in those



ILLUSTRATION NO. 1

Machine Installed by Victor-American Fuel Company at Their Delagua Mine for Treating All Exposed Parts of Mine with Adobe or Stone Dust.



ILLUSTRATION NO. 2

A Coal Rib Untreated and Treated with Stone or Adobe Dust.

mines, south of Aguilar, that nearly all of the large explosions occurred, and nearly all of them in which dust took a prominent part occurred during the cold weather; so the above recommendation was made in order to try to obtain summer conditions underground during cold weather, by raising the temperature of the ingoing air as high as, or higher than, the temperature of the interior of the mine, and by furnishing it with all the moisture it is capable of carrying, thereby preventing the moisture from being carried out of the mine.

The results obtained are beyond the expectations of this department and of the officials of the company. While this may not render these mines immune from dust explosions, or dust from taking part in an explosion of gas, I believe it will, to a great extent, prevent them. (For relative humidity readings, see pages 117 to 121.)

The Victor-American Fuel Company is using adobe dust at its Delagua and Bowen mines, the object in view being the same as that expected from the use of radiators and steam; namely, to prevent coal dust from propagating an explosion by the presence of this incombustible dust when thrown into suspension.

At the Delagua mine a compressor for applying this dust has been put on trucks, so that any working part of the mine may be treated. The manner in which it is applied is the same as that of applying water from a nozzle. (See illustrations Nos. 1 and 2.)

At the Altofts Experimental Station in England numerous experiments have been made with this dust in experimental explosions of dust, and it has proved to be very effective in such cases.

The Victor-American Fuel Company, at its Hastings mine, is using an electric lamp exclusively for general purposes. This lamp was designed by employes of the company, and is known as the Victor lamp. Its illuminative power is about five candle-power, it carries two volts, is built of good material, and is well finished.

I saw this lamp tested in an explosive mixture at a temperature of 240 F., by short-circuiting the current and by breaking the bulb. The test was made with two, four, six, eight, and ten volts. With ten volts ignition was obtained, which was five times the voltage carried by the lamp. Some of the other coal companies are trying this lamp in some of their mines. I consider this a very suitable lamp.

Generally, the companies are doing all they can to interest their employes in first aid and helmet work, by allowing full pay for time spent in training, and by holding contests and giving substantial prizes to the successful competitors.

In southern Colorado a voluntary increase in wages was granted amounting to about 10 per cent to the miners and 5 per cent to the company men.

STRIKES

The strike in northern Colorado, which was declared March 1, 1910, has been partly settled by the American Fuel Company, the Louisville Coal & Land Company, the Big Six Coal Company, and Cannon & Co. complying with the demands of the miners. The strike is still on at the mines of the Rocky Mountain Fuel Company. The National Fuel Company, the Frederick Fuel Company, the Brooks-Harrison Fuel Company, and the Consolidated Coal and Coke Company. Otherwise there was no trouble between the employers and employees that interfered with the production.

NEW MINING LAWS

In 1910 Governor Shafroth appointed a commission to investigate the cause of the great loss of life in our mines, and to prepare a new mining bill to be presented to the Eighteenth General Assembly. This was done, but the bill was so changed and mutilated in the Senate that the Governor vetoed it.

In an effort to better protect the lives of those employed in the coal mines in this state, this department found it necessary to recommend a great many improvements not required by law; and in such cases we were successful with some of the companies, with others not so successful, and with some we failed to make an impression.

I believe it is fair to give credit to those operators who have co-operated with this department in making improvements recommended beyond the requirements of the present mining law. In acknowledging the concessions made by them, it must be further added that there is no authority embodied in the law by which these conceded improvements could have been enforced, no matter how essential they were to protect the life and health of the employes. The Colorado Fuel & Iron Company ranks first in making improvements not compulsory or demanded by the law; it complied cheerfully with most of our recommendations. The Utah Fuel Company, also the Leyden Coal and the Moffat Coal Companies responded very freely. The Victor-American Fuel Company, while not so ready to comply, yet did respond to some extent; this applies also to the National Fuel and the American Fuel Companies. The latter company is a new organization, having effected a merger of several different companies operating small mines. The Rocky Mountain Fuel Company carried out some improvements recommended in its southern and western properties, and a few of the operators of small mines did likewise. However, the latter, in general, gave little or no heed to either the recommendations within or beyond the law.

There are more mines in Boulder County, where the sanitary conditions are not up to the requirements of the law, than there are in all other coal producing counties of the state. This is especially true of the numerous mines operated now by the Rocky Mountain Fuel Company. These mines had been operated by the

Northern Coal & Coke Company until October, 1911, when the former company took them over, all in more or less bad condition, and possibly the failure of the Rocky Mountain Fuel Company to place these mines on a safe and sanitary basis can be attributed to some extent on the grounds of reorganization, the still pending strike in these mines and the great outlay of capital that had already been spent in the purchase of these properties. Yet the safety of life and health of the employes should be the first consideration, and for three years the officials of both the former and the present owners have ignored the urgent recommendations made repeatedly by this department. These adverse conditions are brought about chiefly by improperly conducting the air current and failure to drive cross cuts, and the fact that blasting is allowed at all times during working hours.

The Rocky Mountain Fuel Company also added to its holdings, in the fall of 1912, the Forbes mine, operated by the Chicosa Fuel Company in Las Animas County. I would here like to state that in computing the fatal and non-fatal accident tables for the year 1911, the Rocky Mountain Fuel Company is charged with both tonnage and accidents belonging to the Northern Coal & Coke Company prior to the time the company took charge of the mines it purchased.

I wish to thank the three deputy inspectors—Frank N. Oberding, Henry P. King, and James W. Graham—for their valuable services and their assistance in helping me to perform the duties of this department.

Yours respectfully,

JAMES DALRYMPLE,
State Inspector of Coal Mines.

To the Nineteenth General Assembly, Now in Session,
Denver, Colorado.

Gentlemen: In preparing the Biennial Report of this department, it has been customary to make recommendations to you for the purpose of amending our present and inadequate mining law; but, for some reason, in the past those recommendations received little or no consideration. The result is that those employed in our coal mines—one of the most hazardous occupations known, as well as one of the leading industries of our state—have had less consideration than the wild deer of the forest or the trout in the stream.

Knowing that a new mining bill is to be introduced at this session, I will not at this time make any recommendations to you, but will, by stating a few facts, endeavor to show you some of the reasons why our present coal-mining laws are inadequate.

Our present law, with a few minor amendments, is the same as it was nearly thirty years ago. At that time we had what was considered a very intelligent and competent class of miners; nearly all of them were English-speaking people, capable of taking care of themselves under all reasonable conditions which

might arise. Our haulage was principally animal haulage, traveling at a moderate rate of speed. A mine producing five hundred tons a day was considered a large producer. A mine foreman, and fire bosses when necessary, were employed to look after the property and those employed therein, which was not so difficult to do with an intelligent class of employes.

Today we have a very incompetent class of miners, few of them ever having seen a coal mine until they started work in ours, and very few of them understanding the English language. This is a very serious handicap, because they cannot read our mining law or understand what is being said to them by the officials in charge. They know practically nothing about the mining of coal or the dangers connected therewith.

Our haulage today is done by machinery, traveling at a high rate of speed, which greatly increases the dangers. Where electricity is used for haulage power, there is danger of coming in contact with the trolley wires.

A mine today, to be considered a large producer, has to produce about one thousand tons per day, or double that produced thirty years ago. The increase in the area being worked is equal to the increase in production. The attention to the individual worker has increased enormously, as compared with that given his more competent brother of thirty years ago. These attentions have increased the duties of the underground officials, and the increase in officials has not been equal to the increased duties.

In concluding, I wish to draw your attention to the high rate in our mines of deaths and injuries, which is double that of the United States taken as a whole. This is positive proof that something is wrong.

Hoping that I have made these matters clear to you, and that you will give the mining bill, which is coming before you, your careful consideration, I remain,

Yours respectfully,

JAMES DALRYMPLE,
State Inspector of Coal Mines.

Denver, Colorado, September 19, 1911.

To the Operators of Southern Colorado,
Operating Mines South of Aguilar:

Believing it to be the duty of this office to use all reasonable means at its command to protect life and limb of those engaged in the production of coal, as well as the properties of the companies, and believing the mines in southern Colorado to be amongst the most dangerous coal mines in the world, owing to, first, the very high altitude; second, the low percentage of moisture in the coal; third, the very inflammable character of the dust; fourth, the dust's refusal to absorb water, unless great quantities are used, I desire to call your attention to the following:

This department has observed, in examining these mines, that during the summer months, wherever dust is found, it is generally in a pasty condition. In the winter months, wherever dust is found, it is generally in a very dry condition. These reverse conditions are caused by the outside atmospheric conditions. In the summer months the outside temperature is greater than the inside temperature; consequently, under these conditions, every cubic foot of air that enters the mine deposits a certain amount of moisture, this amount being determined by the difference between the inside and outside temperatures.

In the winter months the conditions are reversed, as the outside temperature is lower than the inside temperature, so that every cubic foot of air that enters the mine carries out a certain amount of moisture, this amount being determined by the difference between the outside and inside temperatures.

I believe, if we can maintain summer conditions in the mines during the winter months, that, as far as the dangers from the coal dust are concerned, we shall be reasonably safe. While I realize that to accomplish this means the expenditure of considerable money, still, when compared with the lives lost last winter and the amount needed to put the mines in operation again, the consideration is small.

In order to obtain the above-described conditions, it will be necessary to install heaters or radiators in the intake air-course, to raise the temperature of the intake above—or, at least, equal to—the temperature of the interior of the mine; accompanied by steam or water sprays, or both, to furnish the necessary moisture.

The Colorado Fuel and Iron Company some time ago put in, at the main North Primero mine, two radiators, accompanied by steam and water sprays, which, in my opinion, were very satisfactory in obtaining the desired results.

I, therefore, recommend that heaters, or radiators, or other means, be used, accompanied by the necessary moisture, in the form of either water or steam, or both. This is not to apply to mines that are already equipped with effective devices to take care of the dust.

In asking you to comply with this letter, I realize that I am asking you to do something which the law does not require; but, believing you have the welfare of your employes, as well as the protection of your property, at heart, I sincerely hope that you will look upon this letter favorably, and that you will do everything in your power to carry out the recommendations.

Yours very truly,

JAMES DALRYMPLE,
State Inspector of Coal Mines.

Denver, Colorado, December 13, 1911.

Mr. W. J. Murray,
Vice-President Victor-American Fuel Company,
Denver, Colorado.

Dear Sir: On December 6, accompanied by Mr. Griffith, Mr. Dean, and Deputy King, I visited your Delagua mine to learn something about the application of stone or adobe dust as a preventive of coal-dust explosions. This is the first place where I have seen it used, and all I know of it is what I have read about it being used at the Altofts Station in England, where the records show, with stone-dust zones, they have stopped coal-dust explosions.

As I told Mr. Dean, it is natural to believe that if it will stop an explosion after it has started, by using it in zones on haulage ways, it should prevent them from starting if applied at the working faces, as well as haulage ways.

However, I believe better results will be gotten from its use in a mine like Delagua, which is naturally damp, than in a mine like the Bowen, which is naturally dry. Of course, this is only my humble opinion.

Yours very truly,

JAMES DALRYMPLE,
State Inspector of Coal Mines.

Denver, Colorado, July 11, 1911.

To the Coal Operators of the State of Colorado.

Gentlemen: As a safety measure, both to life and property, I wish to make the following recommendation:

In all cases where rooms or entries are driven to a fault, or to their distance or land line, and where the pillars are to be left for any length of time, I recommend that crosscuts be driven at the faces of such rooms or entries.

Hoping you will comply with this suggestion, I am,

Very truly yours,

JAMES DALRYMPLE,
State Inspector of Coal Mines.

TABLE 1

SHOWING BY COMPANIES TOTAL PRODUCTION AND NUMBER OF MEN
EMPLOYED FOR EACH FATAL AND NON-FATAL ACCIDENT DURING
THE YEAR 1911

Name of Company or Operator	No. Men Employed	Total Production	No. Fatal Accidents	No. Men Employed per Fatal Accident	No. Non-Fatal Accidents	No. Men Employed per Non-Fatal Accident
Alliance Coal Co.....	56.1	22,926	1	56.1	2	28
Alpha Coal Co.....	53	1,160	..	..	2	26.5
American Fuel Co.....	13	3,000	..	..	1	13
Baldy Coal Co.....	8.8	5,909	..	..	2	4.4
Big Four Coal Co.....	64.9	49,967	1	64.9	9	7.2
Black Canon Coal Co.....	27.4	8,624	..	..	1	27.4
Brooks-Harrison Fuel Co....	26.1	26,846	1	26.1	..	..
Calumet Fuel Co.....	79	54,094	..	..	1	79
Canon Coal Co.....	26	8,878	..	..	1	26
Carbon Coal & Coke Co....	280.3	312,344	18	15.6	3	93.4
Cardiff Coal Co.....	7.2	3,103	..	..	1	7.2
Cedar Hill Coal & Coke Co.	249.8	244,458	6	50	13	19.2
Centennial Coal Co.....	28	14,124	1	28	1	28
Chicosa Fuel Co.....	211.9	182,543	3	70.3	10	21.1
Colorado Fuel & Iron Co....	5,410	3,285,431	19	284.2	46	111.1
Congo Coal Co.....	20.4	1,684	1	20.4	2	10.2
Consolidated Coal & Coke Co.	136.9	106,455	1	136.9	..	..
Coryell Mining & Leasing Co.	45.1	38,216	..	..	3	15.3
Donnelly Coal Co.....	8	3,263	..	..	2	4
Empire Coal Co.....	75.3	75,220	..	..	3	25.1
Fox Coal Mining Co.....	47.3	25,663	..	..	2	23.6
Frederick Coal Co.....	83.5	46,499	..	..	2	41.7
Fruth & Autrey.....	87	47,445	..	..	3	29
Garfield Coal Mining Co....	7.5	5,515	1	7.5	..	..
Gordon Coal Co.....	50.5	22,959	..	..	1	50.5
Grand Junction Mining & Fuel Co.	55.5	46,457	..	..	2	27.7
Huerfano Coal Co.....	215.5	108,447	4	53.7	3	72
Ideal Fuel Co.....	47	20,656	..	..	2	23.5
Juanita Coal & Coke Co....	66.4	54,695	..	..	1	66.4
Littell Coal & Mining Co....	51.2	55,510	..	..	1	51.2

TABLE 1—Concluded

SHOWING BY COMPANIES TOTAL PRODUCTION AND NUMBER OF MEN
EMPLOYED FOR EACH FATAL AND NON-FATAL ACCIDENT DURING
THE YEAR 1911

Name of Company or Operator	No. Men Employed	Total Production.	No. Fatal Accidents	No. Men Employed per Fatal Accident	No. Non-Fatal Accidents	No. Men Employed per Non-Fatal Accident
		No pro-				
Leyden Coal Co.....	120	duction	1	120	..	..
Matchless Coal Co.....	40.6	14,647	..	..	1	40.6
McLaughlin Bros. Coal Co..	37.5	17,609	..	..	2	18.7
New Maitland Coal Co.....	23.5	9,305	..	..	1	23.3
Minnequa Coal Co.....	62.2	41,132	1	62.2	1	62.2
Midvale Coal Co.....	36	16,076	..	..	2	18
Moffat Coal Co.....	104.3	118,210	1	104.3	6	17.5
National Fuel Co.....	626.8	526,357	7	89.5	45	14
Oakdale Coal Co.....	186.5	192,963	1	186.5	4	46.5
Palisade Coal Co.....	18.9	12,011	..	..	1	18.9
Pike's Peak Fuel Co.....	150.5	157,570	..	..	7	21.5
Primrose Coal Co.....	62.2	29,561	..	..	3	21
Rapson Coal Mining Co.....	112.1	86,506	1	112.1	..	..
Rocky Mountain Fuel Co....	1,265	1,001,418	4	316.2	19	66.6
Royal Coal Co.....	35.2	5,883	1	35.2	..	..
Routt County Fuel Co.....	87.2	117,828	..	..	11	8
Rugby Fuel Co.....	58.9	41,333	..	..	1	58.9
South Canon Coal Co.....	57.6	49,360	1	57.6	1	57.6
Southwestern Fuel Co.....	81.5	37,542	1	81.5	4	20
Standard Coal & Land Co..	118.6	133,653	..	..	12	9.9
Star Mining Co.....	17	949	..	..	1	17
Sunnyside Coal Co.....	69.2	39,768	..	..	1	69.2
Union Coal & Coke Co.....	131	80,906	1	131	9	14.5
Utah Fuel Co.....	197	274,528	..	..	9	22
Victor-American Fuel Co....	1,773.6	1,438,247	5	355	28	63.3
Walsenburg Fuel Co.....	40	500	..	..	2	20
Wootton Land & Fuel Co..	134.5	128,731	1	134.5	10	67.7
Yampa Valley Coal Co.....	50.2	63,022	1	50.2	4	5
State of Colorado.....	14,315.2	10,197,595	91	166.45	356	46.9

TABLE 2

NUMBER OF FATAL ACCIDENTS IN 1911
CLASSIFICATION

Chargeable to mines.....	91
Underground	86
Surface	5
Total	91

CAUSES AND PERCENTAGE

Causes	No. of Accidents	Per Cent
Fall of rock and coal.....	46	50.6
Mine cars and motors.....	10	11
Gas and dust explosions.....	17	18.6
Miscellaneous	18	19.8
Total	91	100.0
Number of widows left.....		43
Number of children left.....		114

TABLE 3

NUMBER OF NON-FATAL ACCIDENTS IN AND AROUND MINES IN 1911
CAUSES AND PERCENTAGE

Causes	No. of Accidents	Per Cent
Fall of rock and coal.....	129	42.5
Mine cars and motors.....	87	28.5
Gas and dust explosions.....	12	3.9
Miscellaneous	77	25.1
Total	305	100.0

CLASSIFICATION

Serious	Minor	Trivial
100	140	65
No. Men	No. Killed	No. Injured
Employed	per 1,000 Employed	per 1,000 Employed
14,315	6.35	21.30

TABLE 4

SHOWING BY COMPANIES NUMBER OF MEN EMPLOYED, NUMBER
KILLED, AND NUMBER INJURED PER 1,000 EMPLOYED, 1911

Name of Company	No. Men Employed	No. Killed per 1,000 Employed	No. Injured per 1,000 Employed
		Employed	Employed
Alliance Coal Co.....	56.1	17.8	35.6
Alpha Coal Co.....	53	..	37.74
American Fuel Co.....	13	..	77
Baldy Coal Co.....	8.8	..	227.27
Big Four Coal Co.....	64.9	15.40	138.67
Black Canon Coal Co.....	27.4	..	36.50
Brooks-Harrison Fuel Co.....	26.1	38.30	..
Calumet Fuel Co.....	79	..	12.65
Canon Coal Co.....	26	..	38.50
Carbon Coal & Coke Co.....	280.3	64.22	10.70
Cardiff Coal Co.....	7.2	..	139
Cedar Hill Coal Co.....	249.8	20	52.04
Centennial Coal Co.....	28	35.70	35.70
Chicosa Fuel Co.....	211.9	14.20	47.20
Colorado Fuel & Iron Co.....	5,410.6	3.51	8.50
Congo Coal Co.....	20.4	49	98
Consolidated Coal Co.....	136.9	7.30	..
Coryell Mine Leasing Co.....	45.1	..	66.52
Donnelly Coal Co.....	8	..	250
Empire Coal Co.....	75.3	..	39.8
Fox Coal Mining Co.....	47.3	..	42.3
Frederick Coal Co.....	83.5	..	24
Fruith & Autrey.....	87	..	34.5
Garfield Coal Mining Co.....	7.5	133	..
Gordon Coal Co.....	50.5	..	20
Grand Junction Mining Co.....	55.5	..	36
Huerfano Coal Co.....	215.5	18.5	13.7
Ideal Fuel Co.....	47	..	42.5
Juanita Coal & Coke Co.....	66.4	..	15
Littell Coal & Mining Co.....	51.2	..	19.5
Leyden Coal Co.....	96	10.4	..
Matchless Coal Co.....	40.6	..	24.6
McLaughlin Bros' Coal Co.....	37.5	..	53.3
Midvale Coal Co.....	36	..	55.5

TABLE 4—Concluded

SHOWING BY COMPANIES NUMBER OF MEN EMPLOYED, NUMBER
KILLED, AND NUMBER INJURED PER 1,000 EMPLOYED, 1911

Name of Company	No. Men Employed	No. Killed per 1,000	No. Injured per 1,000
		Employed	Employed
Minnequa Coal Co.....	62.2	16	16
Moffat Coal Co.....	104.3	9.5	57.5
National Fuel Co.....	626.8	11.2	71.8
New Maitland Coal Co.....	23.5	..	42.5
Oakdale Coal Co.....	186.5	5.36	21.44
Palisade Coal Co.....	18.9	..	53
Pike's Peak Fuel Co.....	150.5	..	46.50
Primrose Coal Co.....	62.2	..	48.20
Rapson Coal Mining Co.....	112.1	8.92	..
Rocky Mountain Fuel Co.....	1,265	3.16	15
Routt County Fuel Co.....	87.2	..	126
Royal Coal Co.....	35.2	28.40	..
Rugby Fuel Co.....	58.9	..	16.90
South Canon Coal Co.....	57.6	17.34	17.34
Southwestern Fuel Co.....	81.5	12.27	49
Standard Coal & Land Co.....	118.6	..	101.20
Star Mining Co.....	17	..	59
Sunnyside Coal Co.....	69.2	..	14.45
Union Coal & Coke Co.....	131	7.60	68
Utah Fuel Co.....	197	..	45.70
Victor-American Fuel Co.....	1,773.6	2.82	15.80
Walsenburg Fuel Co.....	40	..	50
Wootton Land & Fuel Co.....	134.5	7.44	74.35
Yampa Valley Coal Co.....	50.2	19.91	79.68
State of Colorado.....	14,315	6.35	21.30

TABLE 5

TONNAGE BY COMPANIES PER FATAL AND NON-FATAL ACCIDENT

Name of Company	Tons	Tons
	Produced per	Produced per
	Fatal Accident	Non-Fatal
	Chargeable	Accident in
	to Mines	and Around
		Mines
Alliance Coal Co.....	22,926	11,463
Alpha Coal Co.....	....	580
American Fuel Co.....	....	3,000
Baldy Coal Co.....	....	2,954 5-10
Big Four Coal Co.....	49,967	5,551 8-9
Black Canon Coal Co.....	....	8,624
Brooks-Harrison Fuel Co.....	26,846	....
Calumet Fuel Co.....	....	54,094
Canon Coal Co.....	....	8,878
Carbon Coal & Coke Co.....	17,352 8-18	104,114 2-3
Cardiff Coal Co.....	....	3,103
Cedar Hill Coal Co.....	48,891 3-5	18,804 6-13
Centennial Coal Co.....	14,124	14,124
Chicosa Fuel Co.....	60,847 2-3	18,254 3-10
Colorado Fuel & Iron Co.....	172,917 8-19	71,422 19-46
Congo Coal Co.....	1,684	842
Consolidated Coal Co.....	106,455	....
Coryell Mine Leasing Co.....	....	12,738 2-3
Donnelly Coal Co.....	....	1,632 5-10
Empire Coal Co.....	....	25,073 1-3
Fox Coal Mining Co.....	....	12,831 5-10
Frederick Coal Co.....	....	23,249 5-10
Fruith & Autrey.....	....	15,815
Garfield Coal Co.....	5,515	....
Gordon Coal Co.....	....	22,959
Grand Junction Mining & Fuel Co.....	....	23,228 5-10
Huerfano Coal Co.....	27,111 3-4	36,149
Ideal Fuel Co.....	....	10,328
Juanita Coal & Coke Co.....	....	54,695
Littell Coal & Mining Co.....	....	55,510
Leyden Coal Co.....	None	....
Matchless Coal Co.....	....	14,647

TABLE 5—Concluded

TONNAGE BY COMPANIES PER FATAL AND NON-FATAL ACCIDENT

Name of Company	Tons Produced per Fatal Accident Chargeable to Mines	Tons Produced per Non-Fatal Accident in and Around Mines
McLaughlin Bros.' Coal Co.....	....	8,804 5-10
Midvale Coal Co.....	....	8,038
Minnequa Coal Co.....	41,132	41,132
Moffat Coal Co.....	118,210	19,701 2-3
National Fuel Co.....	75,193 6-7	11,696 37-45
New Maitland Coal Co.....	....	9,305
Oakdale Coal Co.....	192,963	48,240 3-4
Palisade Coal Co.....	....	12,011
Pike's Peak Fuel Co.....	....	22,510
Primrose Coal Co.....	....	9,853 2-3
Rapson Coal Mining Co.....	86,506	....
Rocky Mountain Fuel Co.....	250,354 5-10	52,706 4-19
Routt County Fuel Co.....	....	10,711 7-11
Royal Coal Co.....	5,833	....
Rugby Fuel Co.....	....	41,833
South Canon Coal Co.....	49,360	49,360
Southwestern Fuel Co.....	37,542	9,855 5-10
Standard Coal & Land Co.....	....	11,137 3-14
Star Mining Co.....	....	949
Sunnyside Coal Co.....	....	39,768
Union Coal & Coke Co.....	80,906	8,989 5-9
Utah Fuel Co.....	....	30,503 1-9
Victor-American Fuel Co.....	287,649 2-5	51,365 27-28
Walsenburg Fuel Co.....	....	250
Wootton Land & Fuel Co.....	128,731	12,873 1-10
Yampa Valley Coal Co.....	63,022	15,755 5-10
State of Colorado.....	122,860 2-10	33,434 4-10

TABLE 6

FATAL ACCIDENT RATE PER 1,000 EMPLOYEES AND NUMBER OF LIVES LOST PER MILLION TONS OF COAL MINED IN NORTH AMERICA, BY STATES AND PROVINCES, 1886 TO 1908

State or Province	Years Considered	Tons of Coal Produced	Employees	Accidents Per 1,000 Employees	No. Fatal		Lives Lost per 1,000,000
					Employes	Tons Mined	
Alabama	16	142,592,400	227,828	1,037	4.55	7.27	
Arkansas	6	12,307,804	25,651	76	2.96	6.17	
Colorado	25	117,603,271	188,054	1,074	5.71	9.13	
Illinois	26	611,071,223	1,030,800	2,407	2.34	3.94	
Indiana	24	146,490,472	245,115	547	2.23	3.73	
Iowa	21	109,736,706	264,400	573	2.17	5.22	
Kansas	22	86,096,365	184,895	415	2.24	4.82	
Kentucky	22	112,218,992	218,866	375	1.70	3.34	
Maryland	19	84,322,336	93,269	165	1.77	1.96	
Michigan	10	13,081,027	23,356	68	2.91	5.20	
Missouri	19	61,065,829	151,444	261	1.72	4.27	
Montana	18	24,464,869	37,557	138	3.67	5.61	
New Mexico	14	19,243,519	29,325	212	7.23	11.02	
North Dakota	1	320,742	631	4	6.34	12.47	
Ohio	34	467,312,293	883,812	1,845	2.14	3.95	
Oklahoma	15	33,906,783	90,774	460	5.07	13.57	

Pennsylvania.—						
Anthracite	39	1,782,024,124	4,344,074	14,625	3.37	8.21
Bituminous	32	1,806,371,376	2,729,155	6,919	2.54	3.83
Tennessee	18	69,368,153	143,029	627	4.38	9.04
Utah	16	17,754,456	24,424	285	11.67	16.05
Washington	17	38,231,315	68,645	464	6.76	12.14
West Virginia	25	453,581,594	625,566	2,887	4.62	6.36
Wyoming	5	26,140,782	29,227	339	11.60	12.97
Totals	..	6,235,366,431	11,639,897	35,803	3.08	5.74
British Columbia	..	22,106,271	68,698	497	7.23	22.48
Nova Scotia	..	90,512,879	236,998	720	3.04	7.95
Totals	..	112,619,150	305,696	1,217	3.98	10.81
Grand Totals	..	6,347,985,581	11,945,593	37,020	3.10	5.83

STATE OF COLORADO—LIVES LOST PER 1,000 EMPLOYED

1909	6.8
1910	21.6
1911	6.35
1912	7.10
Total	—
Average	41.85
	10.46

TABLE 7

FATAL ACCIDENTS IN 1901—UNDERGROUND

Date	Name of Person	Nationality	Occupation	Single or		Age	Number of		Name of		Cause of Accident
				Married	Children		Married	Children	Mine	County	
Jan. 2	Jordan Enokloff	Bulgarian	Machine helper	28	Married	2	Married	2	Hecla	Boulder	Fall of rock
Jan. 3	Barney Madonna	Italian	Miner	45	Married	3	Married	3	Southwestern	Las Animas	Heart failure
Jan. 4	Barcelo Armerigo	Mexican	Miner	40	Widower	4	Widower	4	Wootton	Las Animas	Fall of rock
Jan. 6	William Ambrose	German Pole	Miner	41	Single	..	Single	..	Pinon	Huerfano	Fall of rock
Jan. 12	John Short	Slav	Miner	49	Single	..	Single	..	Southwestern	Las Animas	Caught by cars
Jan. 13	Procoro Elies	Mexican	Miner	26	Single	..	Single	..	Engle	Las Animas	Fall of slate
Jan. 14	Joe Vida	Hungarian	Miner	42	Married	4	Married	4	Toller	Las Animas	Fall of rock
Jan. 16	Sam Baratona	Italian	Miner	34	Married	4	Married	4	Forbes No. 6	Las Animas	Fall of rock
Jan. 16	C. Strombaugh	English	Fire boss	60	Married	3	Married	3	Robinson	Huerfano	Fall of rock
Jan. 28	Angelo Arco	Italian	Miner	25	Single	..	Single	..	Bervind	Las Animas	Fall of coal
Jan. 31	Pete Martery	Italian	Rope-rider	19	Single	..	Single	..	Midway	Huerfano	Fall of rock
Feb. 9	See report on Cokedale explosion										
Feb. 9	Sewell Moore	American	Nipper	18	Single	..	Single	..	Morley	Las Animas	Run over by motor
Feb. 27	Guiseppi Petre	Austrian	Miner	26	Single	..	Single	..	Toller	Las Animas	Electrocuted
Mch. 3	John Gesper	Austrian	Miner	50	Married	2	Married	2	Cass	Las Animas	Fall of coal
Mch. 18	John Morton	American	Company man	29	Married	2	Married	2	Beacon	Las Animas	Electrocuted
Mch. 29	Rafael Gusman	Mexican	Miner	32	Married	3	Married	3	Morley	Las Animas	Fall of coal
Apr. 8	Chas Norman	American	Timberman	33	Married	1	Married	1	Baum	Weld	Fall of rock

Apr. 10	Frank Brodny	Austrian	Miner	25	Single.....	..	Monarch No. 2.....Boulder.....	Fall of sandstone.
Apr. 11	Tom Sumsky	Slav	Miner	36	Married....	4	Pryor.....Huerfano.....	Fall of rock
Apr. 15	Henry Kraushope	German	Miner	45	Married....	1	Parkdale....Weld.....	Fall of coal
Apr. 26	Isnel Casto	Mexican	Miner	22	Single.....	..	Kenneth....Las Animas.....	Fall of rock
May 22	Mike Naglaich	Austrian	Miner	27	Married....	2	Greenville....Las Animas.....	Fall of rock
May 25	Carmela Leorosi	Italian	Miner	40	Single.....	..	Globe.....Huerfano.....	Fall of rock
May 30	Joe Parfna	Italian	Miner	34	Single.....	..	Perry....Routt.....	Run over by cars
June 29	Alberto Guigli	Italian	Miner	30	Single.....	..	Walsen....Huerfano.....	Fall of slate
July 6	Ignesio Rameriz	Mexican	Miner	35	.....	..	.....Berwind....Las Animas.....	Fall of rock
July 10	Stanley James Cornish	...English	helper	26	Single.....	..	Gulch....Pitkin.....	Crushed between cars
July 17	William Young	American	helper	26	Single.....	..	Oakdale....Huerfano.....	Severed intestine
July 19	John Sebed	Pole	Miner	..	Married....	3	Reliance....Huerfano.....	Fall of rock
July 19	Rada Loncar	Slav	Miner	29	Single.....	..	Delagua No. 2....Las Animas.....	Fall of rock
July 24	Gaudulupe Guterrez	...Mexican	Miner	24	Single.....	..	Morley....Las Animas.....	Fall of rock
Aug. 3	Arthur Latham	American	General manager	68	Married....	1	Centennial....Boulder.....	Caught by cage
Aug. 1	Stephen Fisher	American	Sinker	51	Married....	5	Leyden....Jefferson.....	Hit by rock
Aug. 4	Venisiari Colombo	Italian	Miner	23	Single.....	..	Chandler....Fremont.....	Fall of slate
Aug. 9	John Szarnos	Slav	Miner	22	Single.....	..	Ideal....Huerfano.....	Fall of rock
Aug. 11	Peter Cincueho	Italian	Miner	42	Single.....	..	Hastings....Las Animas.....	Fall of coal
Aug. 23	Ralph Morgan	American	Driver	27	Single.....	..	Robinson....Huerfano	Crushed by car and rib
Sept. 4	Mike Kresin	Pole	Miner	43	Married....	8	Greenville....Las Animas.....	Fall of rock
Sept. 4	Nic Gouyouch	Montenegrth	Miner	22	Single.....	..	Garfield....Mesa.....	Fall of coal

TABLE 7—Concluded

FATAL ACCIDENTS IN 1911—UNDERGROUND

Date	Name of Person	Nationality	Occupation	Single or		Children	Name of		Cause of Accident
				Married	Age		Mine	County	
Sept. 6	Emmanuel Teetler	Tyrolian	Miner	Married	29	2	Rockvale	Premont	Missed shot
Sept. 15	Pete Martino	Italian	Miner	Single	30	..	South Canon	Garfield	Smothered by gas
Sept. 19	Harry Crist	Greek	Miner	Single	21	..	Big Four	Huerfano	Hit by cars
Sept. 22	Joe Vilentio	Slav	Miner	Married	40	4	Toller	Las Animas	Crushed by car
Oct. 5	Edgar Viggers	American	None	Single	12	..	Nonparell	Boulder	Fell down shaft
Oct. 6	Peter Mekrovich	Montenegrin	Miner	Married	45	4	Delagua	Las Animas	Bright's Disease
Oct. 9	Joe Bertok	Slav	Miner	Widower	39	3	Tabasco	Las Animas	Missed shot
Oct. 18	B. Kerottl	Austrian	Miner	Single	39	..	Rouse	Huerfano	Fall of rock
Oct. 26	Charles Reed	Colored	Rope-rider	Married	..	..	Huerfano	Huerfano	Struck by cage
Oct. 27	Robert Larson	Swedish	Miner	Married	35	1	Pietou	Huerfano	Fall of rock
Oct. 30	Joseph Bulc	Slav	Miner	Single	25	..	Hastings	Las Animas	Fall of slab of clod
Nov. 9	John Draspa	Pole	Miner	Married	34	4	Huerfano	Huerfano	Fall of rock
Nov. 17	George Takaki	Japanese	Miner	Widower	45	1	Huerfano	Huerfano	Fall of rock
Nov. 22	Kogan Aggan	Turk	Miner	Single	30	..	Tioga	Huerfano	Fall of draw slate
Nov. 25	Albino Rizzo	Austrian	Miner	Married	34	1	Cokedale	Las Animas	Fall of rock
Nov. 30	Fidèle Montoya	Mexican	Driver	Married	22	..	Parkdale	Weld	Fell off car
Dec. 1	Alexander Jukoverzk	Russian	Miner	Single	24	..	Industrial	Boulder	Fall of rock
Dec. 1	Frank Slak	Austrian	Miner	Single	20	..	Ludlow	Las Animas	Fall of rock
Dec. 1	Tony Gadritlis	Pole	Miner	Single	30	..	Forbes	Las Animas	Fall of stone

Dec. 2	Rafael Quintanno	Mexican	Miner	39	Married....	..	.....	Pictou....Huertano.....	Fall of rock
Dec. 4	Frank Peduci	Italian	Fire boss	44	Married....	2	.....	Royal....Las Animas....	Suffocated by gas
Dec. 6	Paul Drumsack	Austrian	Miner	55	Widower..	..	.....	Congo....Las Animas....	Fall of rock
Dec. 11	Matt Malezvoek	Austrian	Miner	31	Single.....	..	.....	Piedmont....Las Animas....	Fall of rock
Dec. 12	Thomas J. Knox	American	Miner	60	Married....	5	.....	Robinson....Huertano.....	Fall of slate
Dec. 15	R. A. Oliver	American	Miner	44	Married....	4	.....	Rapson....Las Animas....	Fall of rock
Dec. 15	E. S. McKinley	American	Superintendent	28	Single.....	..	.....	Yampa Valley....Routt....	Hit by car
Dec. 15	Mike Pinchak	Slay	Miner	35	Married....	4	.....	Rockvale....Fremont....	Not stated
Dec. 19	W. B. Buckner	Colored	Miner	42	Married....	3	.....	Suffield....Las Animas....	Fall of rock
Dec. 27	Luigi D. Gregoria	Italian	Miner	22	Single.....	..	.....	Morley....Las Animas....	Fall of rock
Dec. 30	Richard A. Flinn	American	Driver	21	Single.....	..	.....	Monarch No. 1....Boulder....	Run over by car

FATAL ACCIDENTS IN 1911—SURFACE

Aug. 25	Mile Ivansevic	Slav	Car-dropper	26	Single.....	..	.....	Tabasco....Las Animas....	Run over by railroad cars
Aug. 25	Tony Velatte	Italian	Laborer	16	Single.....	..	.....	McKinley....Routt....	Struck by tramway rope
Sept. 17	Martin Atida	Mexican	Bucket-dumper	45	Married....	2	.....	Rockland....Huertano....	Fell into chute
Oct. 28	Paul Tennant	American	Weigher	16	Single.....	..	.....	Greenville....Las Animas....	Bridge collapsed
Oct. 28	Ben Fallatti	Italian	Miner	19	Single.....	..	.....	Greenville....Las Animas....	Bridge collapsed

REPORT ON COKEDALE EXPLOSION

Denver, Colorado, March 20, 1911.

Hon. John F. Shafroth,
Governor of Colorado.

Dear Sir: Herewith I beg to submit to you my report covering the findings of my investigation of the Cokedale explosion, which occurred on February 9, 1911, at 9 p. m. I arrived at the scene of the disaster on the 11th, and, accompanied by Messrs. Oberding and King, proceeded to make a careful examination of the workings of the mine, to ascertain the probable cause of the explosion, which cost the lives of seventeen men.

LOCATION OF MINE

The Cokedale property is situated in what is known as the Reilly Canon, nine miles west of the town of Trinidad, Las Animas County, and is connected by a spur with the main line of the Denver & Rio Grande Railroad. It is owned and operated by the Carbon Coal and Coke Company, with Mr. Frank Guiterman in charge as general manager and Mr. F. P. Bayles, as superintendent.

DESCRIPTION OF MINE AND MODE OF WORKING

The coal seam of this mine is of the bituminous coking variety, averages about six feet in thickness, and is very impure. The mine has been operated about four years, and at the time of the accident had a daily producing capacity of 1,200 tons. The mine is opened by a slope and air-course, and is worked by the double entry room and pillar method. The workings are laid out in blocks or sections, named alphabetically, and three sections are being worked; to-wit, A, B, and C. There are three pairs of entries working in C, which are being pushed to the boundary line of this section. The idea is to do all the development work in Section C while the coal in Sections A and B is being worked out. Thus the innermost rooms are started first, thereby allowing the extraction of the coal upon the retreating instead of the advancing system. The surface being very irregular, the seam crops out in some parts of the canon, and two entries are driven to the surface on the seam.

The slope is equipped with an endless chain for hoisting purposes, electric motors delivering the coal at the bottom of the slope, the electric power being shut off at night before the shot-firers enter the mine.

VENTILATION

There are three intakes; namely, the fifth east, the third south, and the main slope, with a 15' x 7' exhaust fan. When I inspected the mine on November 7, 1910, I considered it in

a safe and sanitary condition. The ventilation was good and the mine free from explosive gas. The sprinkling system in practice is from pipes under pressure, and in some parts of the mine, where the pipes do not extend, a hose is attached to the end of the water pipe, and the sprinkling is conducted in this manner to points where it is desired. I further considered the hygrometric conditions very favorable. At this time the company had installed a shot-firing system by an electric battery, whereby all shots were fired when all the employes had left the mine, and it was in use when I made my inspection. It seems, however, that there was considerable trouble with this system of firing from missed shots, and it was abandoned and shot-firers installed again; and apparently shots were fired when other employes were in the mine.

CHECKING IN AND OUT SYSTEM

At the entrance to the fifth east, where all employes pass, a checking in and out station is situated, and as the men enter the mine, each one is given a check, which he returns to the checkman when he comes out.

CHARACTER OF EXPLOSION AND RESCUING

When the explosion occurred, it was heard very distinctly in Trinidad. Deputy Inspector King, who happened to be there, hurried at once to Cokedale, and found that the fan was not damaged, although part of the force came out through the air-course and the fan-house. He immediately, accompanied by others, entered the eighth west, reaching the inner workings of Section C about 1:30 a. m. This fact leads me to believe that, if the eight miners working in this section had remained in their working places, they would have been saved. Deputy Inspector Oberding was in Walsenburg. When he heard of the explosion, he too hastened to Cokedale; but I was not notified, and learned of it only the next day through the morning papers. I took the first train out from Denver and, upon arriving there, accompanied by Superintendent Bayles, Firebosses Jones and Brown, and Deputy Inspectors King and Oberding, entered the mine, and found that very little damage had been done to the property. We made good progress, exploring the entire mine in three days. I returned to Denver on the 14th, but on the 15th I received a telephone message from Mr. Bayles, asking me to return to make a further examination of the mine before preparing my report. I complied with his request and returned at once. This time I was accompanied by Deputy Inspectors Douthwaite and King, and the mine was again carefully examined.

METHOD OF HANDLING POWDER AND PRIMERS, AND THE FIRING OF SHOTS

Powder and primers were handled exclusively by the shot-firer—a corps consisting of nine men. The powder was taken into

the mine in a car, under the supervision of the chief shot-firer. Upon reaching the different sections where shots were to be fired, part of the powder was taken out and loaded into other cars, and one was hauled to each district. The amount of powder carried into the mine on the night of the explosion was 2,157 sticks, or about 540 pounds. Part of it was No. 2 Hercules 40 per cent Giant; and part of it consisted of Aetna B—a permissible powder, with which it seems they were experimenting, with the intention of using it exclusively if it proved satisfactory. The shot-firers' records show that they had refused to fire some shots, because the miners had not cleaned out the drillings in the holes, and in some cases because of dependent shots. I found many blown-out shots.

FIRE BOSSES AND COMPANY INSPECTORS AND THEIR DUTIES

There were three men employed as fire bosses and company inspectors. Two acted in both capacities, the other only as inspector. Two of these men examined the mine in the morning before the other employes entered for their day's work. Then one acted as inspector from 7 a. m. until noon, the other as fire boss, while the third started at 7 a. m. and worked until quitting time as inspector. The inspectors had the authority to suspend any miner for disobeying their orders, and before being reinstated the delinquent had to promise to obey in the future. However, notwithstanding the authority of the inspectors, the record of their findings showed that a dangerous rock had been reported for several days, and when I examined the mine I found it still hanging. The record of the fire bosses showed that a little gas had been found in the entries of Section C between the third and the sixth of the month. The accumulation of this gas was caused by too great a distance between cross-cuts.

CAUSE AND ORIGIN OF EXPLOSION

Although two of the shot-firers escaped from the mine after the explosion, they could give no information relating to its cause, or in what part of the mine it started. Therefore, in determining the point or origin, I had to be guided entirely by the directions the forces traveled, which were indicated by the strewn timbers, the source from which they came, and the direction in which they were blown. While the forces were conflicting in some parts of the mine, it is my opinion—concurrent in by Messrs. Oberding, King, and Douthwaite—that the initial point was a working cross cut between Rooms 16 and 17 on the fourth west B, which was being driven from Room 17. The force radiated from here, traveling south to the entry, and east into Rooms 18, 19, 20, 21, and 22. In Room 21 there was evidently an explosion of powder that had been left in the gob. There was a radiation of the force from this point also. Room

22 was the last room shot in the district. The bodies of two shot-firers were found in Room 24. They had tamped two shots in this room, and were preparing the third when the explosion occurred. They were the only ones found near where they were supposed to be when the explosion took place. Therefore, I believe these men were nearer the initial point than any of the other employes. On one side from Room 18 to 22, and on the other side to Room 11, there was evidence of an intense heat having existed, as was shown by the timbers in this locality, which were heavily coked on all sides. The force, going south, divided when it struck the entry, part of it going east, the course of which has already been described above, and the other part west. The latter split at Room 10, which is connected with the fifth west B. It traveled northward up this room, displaced the timbers, allowing the roof to fall. When it reached the haulage cross-cut between the fifth and sixth B, it struck a car that evidently had contained a considerable amount of powder, which it exploded, turning the car upside down and wrecking it. The force from this point traveled north, south, east, and west. The south force, which traveled back through Room 10 toward the fourth west B, carried one of the wheels of the car found on the haulage cross-cut between the fifth and sixth west B. This wheel was found on top of the roof which had fallen after the first force passed through this room. This proves that the wheel was placed there by the last force. Another car was found on the fourth west B entry, at the entrance to Room 8. This car also had powder in it at the time of the explosion, as it was badly wrecked and turned upside down. The door of this car was found in an entry cross-cut about 100 feet east of the car, while one of the hubs was found at Room 6, seventy-two feet west of the car. The fourth west B entry from Room 13 dips west at the rate of 4 per cent, and it is my opinion that this car was left standing on the grade and set in motion probably by the concussion of the explosion, and the powder it had contained exploded while it was in transit. Another car was found on the third south that had had powder in it, which the force exploded. The drawbar of this car was bent downward at both ends until the bumpers rested on the floor, indicating that it had been struck by a straight-downward force. The body of the car was badly wrecked. At the junction of the first and second west B a mule was found, badly singed. He had been hitched to a car containing fourteen sticks of powder, to which the tail chain was still attached, but the mule had broken loose. Twenty-five feet west of this car was a sack, slightly singed, with forty pounds of powder still intact. We discovered numerous blown-out shots, caused by either the shots being too large or the charge too small. Some parts of the mine were found in a very dusty condition; namely, the first, second, and third west B entries, and the rooms off the Japan entry.

CONCLUSION

I believe it was a dust explosion, caused by a blown-out shot and accompanied by an overcharged shot. The force of the explosion was augmented by at least five powder explosions in different parts of the mine. The overcharging of the shot was probably due to an irregularity in the roof, which in this instance came down very precipitately, but uniformly, thereby reducing materially the amount of work necessary for the charge of powder.

All the victims died from suffocation. Two of them were not in the mine at the time of the explosion, but lost their lives in an effort to rescue their fellow-men. One was E. A. Sutton, assistant superintendent of the Cokedale mine, and the other Robert Meek, a resident from Starkville who came to Cokedale to aid in the work of rescue.

Below is a table giving the names, etc., of the persons killed:

Name of Person	Nationality	Occupation	Age	No. of	
				Single or	Children
Rudolph Seliga.....	Pole.....	Miner	..	Married	..
Andy Podzorsky.....	Pole.....	Miner	..	Married	3
B. Hodbod	Pole.....	Miner	..	Married	2
Likas Gozndek.....	Pole.....	Miner	..	Married	4
Joe Malach.....	Pole.....	Head shot-firer.....	..	Married	2
Ludwig Klapuch.....	Pole.....	Shot-firer	..	Married	1
Karl Piecha	Pole.....	Shot-firer	..	Married	..
Karl Francis.....	Pole.....	Shot-firer	..	Married	3
Andy Ranevsky.....	Pole.....	Shot-firer	..	Married	..
John Freisch	Pole.....	Shot-firer	35	Married	2
Joseph Makrosh.....	Pole.....	Shot-firer	35	Married	..
Doniono Tabarelli.....	Tyrolese.....	Miner	37	Single	..
Fortunato Zanot.....	Italian.....	Miner	33	Married	2
Valantine Tretter.....	Austrian.....	Miner	35	Married	4
Joe Ghezzi.....	Austrian.....	Miner	..	Single	..
E. A. Sutton.....	American.....	Assistant Superintendent	..	Single	..
Robert Meek.....	American.....	Miner	48	Married	5

Respectfully submitted,

[Signed] JAMES DALRYMPLE,
State Coal Mine Inspector.

IMPROVEMENTS IN 1911

BOULDER COUNTY

Monarch No. 2: Improvements in tippie. Scales were moved back near the shaft, and two sets of goose-necks put in where there was only one set before; into the coal chute, two shaker screens and lengthened the chute. Improvements at bottom of shaft. Took three feet of rock down in roof and raised the cage rest three feet, reducing the grade of track at bottom of shaft 2 per cent.

Centennial: Entry awning; building five houses for men employed in and about the mine; extending electric power in mine for light, pumps, and hoist, and for lighting and wiring the houses.

Nonpareil: Nothing but entry work, which blue-print to be filed January 1 will show.

Standard: New houses built on top. Electric haulage system, electric lights, and running water installed. New five-foot Booster fan installed in pit. New rails, mules, pit cars, etc., purchased. New development work pushed on new lease of 320 acres.

Senator: New boiler and new well. We have also done about 600 feet on entry.

Matchless: Only the work of regularly opening up works. An attempt was made to work long wall, but it did not prove feasible. Room and pillar work was resumed.

Capitol: New overcast in fifth northwest entry. This increases the area from six square feet to twenty-two square feet. All airways timbered; slate falls cleaned up; haulage roads timbered and brushed; all tracks repaired. Bottom of downcast shaft repaired, mechanical alterations made, and the steam from the fan turned into the downcast shaft, thereby keeping it from freezing and causing the air to retain a certain amount of moisture, which keeps the coal dust damp. Fourth southeast entry cleaned up and brushed. New track laid and new air lines put in for a distance of 800 feet. This will open up a new coal district. The boilers on the surface repaired, new combustion chambers and fire grate walls built, and new tracks made to take coal into the boiler-house. Various rooms and pillars, that were lost by caves, opened up and worked. Repairs in progress to open up first southeast. These improvements were all made since October 9, 1911.

DELTA COUNTY

Farmers' (Paonia Coal Company): Completed air-course; built chimney and furnace; driven main entry about 200 feet, and turned six new rooms.

Black Diamond: 572 feet of entry work done Room 14; turned ready to pull coal out when needed.

King: Stone stoppings, stone and cement overcasts; fan sixteen feet; sprinkling system; two boilers; railroad-track scale.

Cedaredge: Eighty feet of entry driven.

EL PASO COUNTY

Curtis: Only usual developments.

Keystone: 1,708 feet of entry; 50 feet of cross-cuts.

Rapson No. 2: Only usual development work.

Patterson: New air-shift.

FREMONT COUNTY

Royal Gorge: Drift 192 feet west from four-foot vein on fifth level, opening up new six-foot vein; 400 feet of entry north and 400 feet south driven on six-foot vein; 250 feet of entry on four-foot vein, seventh level.

Nonac: None.

Rockvale: Sprinkling car; 7,398 feet of entry driven.

Coal Creek: New boiler installed; sprinkling car; fan, fan-house, and engine; power lines, etc.; 5,608 feet of entry driven.

Fremont: Sprinkling car; 3,150 feet of entry driven.

Willie: Wagon road to mine and bridge, amounting to \$200.

Chandler: Fireproof underground stable, steel head frame over air-shaft, mine telephone, and other mining machinery, \$9,000.

Radiant: Well and pipe lines for water supply; mine pump; shop buildings, tramways, and mining machinery; \$10,000.

Colorado Central: Air-shaft sunk to depth of 800 feet; entries driven continuously to form connection with air-shaft when completed.

Emerald: Opened up two entries in bottom of slope; graded slope; built dirt dump car; installed engine for hauling same; cleaned up entry that had fallen in for several years.

Magnet: Installed electric mine hoist.

GARFIELD COUNTY

Sunshine Canon: No development work; new fifteen-ton locomotive.

Vulcan: Completed equipment; opened up the No. 3 level by driving through fire in the Wheeler seam.

Midland: Completed installing new plant and driving new slope entry.

GUNNISON COUNTY

Bulkley: Drove about 3,000 feet of new entries and air-courses.

Crested Butte: Sprinkling system, two hydraulic cartridges, 862 feet of entry driven, \$6,000.

Floresta: 2,378 feet of entry driven.

Porter: A lower vein being opened by drift.

Horace: An air-shift completed.

HUERFANO COUNTY

Rockland: Delayed in development by immense flow of water. Drove entries about 800 feet.

Turner: Built tippie 200 feet long; put in boiler and engine.

Pryor: Electric hoist underground; new fan; new coal-cutting machine.

Pictou: Sprinkling system, turbine pump, small electric hoist, \$4,800; 5,658 feet of entry driven.

Big Four: Installed coal conveyor to boiler-house; one eighty-ton coal bunker; one pea-coal elevator with eighty-ton bunker; one 25-H.P. engine for above; one steam heater for heating water for boilers.

Beacon: New tippie.

Robinson: Sprinkling car; 6,066 feet of entry driven.

Ideal: Ventilating fan and motor, barn and corral, office and warehouse, water system, sprinkling system, power plant, mining machinery, \$23,000; 3,262 feet of entry driven.

Cameron: Barn and hay storage, \$800; 2,468 feet of entry driven.

Walsen: Two Sullivan mining machines, sprinkling system, fifty pit cars, hydraulic cartridges, \$14,000; 5,183 feet of entry driven.

Hezron: Sprinkling system; no entry driven.

Lester: Sprinkling system; exciter for power plant; thirty tons of twenty-five-pound rails; 10,638 feet of entry driven.

Rouse: Power line to Hezron, \$2,000; 5,333 feet of entry driven.

Maitland: Tanks and pipe lines for sprinkling system, electric mine lamps, and other mining machinery, \$5,000.

Sunnyside: New conveyor; relaid track in mine with heavier steel; new rooms; track scales; continued entry and started fifth and sixth dips.

Pinon: Circular picking-table.

Loma: 2,000 feet of entry driven; one tippie for wagon mine; one Jeffery short wall mining machine.

Breen: 100 feet of entry; one pneumatic mining machine; one Jeffery mining machine; one motor generator set; one new tippie; one new railroad track; one new railroad-track scale.

Rugby: Commenced work on new seam of coal and equipped same; installed electric hoist.

Reliance: Main slope driven 550 feet; slope air-course, 500 feet right side; slope air-course, 150 feet left side; first west en-

try, 500 feet; first west entry air-course, 500 feet; first east entry, 400 feet; first east entry air-course, 375 feet. Installed temporary tippie, boiler, hoist.

Ravenwood: Tenant-houses, wells and pipe lines for water supply, wagons, fire apparatus, pit cars, and other machinery, \$415,000.

Oakdale: 4,900 feet of entry; put in 4,000 feet of pipe line for sprinkling purposes, and one pump; made new man-way to slope workings. Both mines have now four escape-ways for the men.

Black Canon: 100 feet of entry.

Gordon: New slope, about 600 feet.

Globe: New fan installed.

JEFFERSON COUNTY

Leyden: The shaft and plant destroyed are being completely rebuilt. An entirely new shaft and plant are also under construction.

LAS ANIMAS COUNTY

Thor: Tail rope haulage system.

Beacon: Installed five small electric pumps for gathering water to main pump. Also, Deming triplex in new slope, which is being opened; same motor-driven. Also 375 H. P. capacity for slope hoisting, and 50 H. P. capacity hoist for handling coal on the outside tram; both of above motor-driven. 5 x 10 Jeffrey fan, motor-driven.

McLaughlin: Two new railroad tracks, \$2,200; new pass-by, \$325; new furnace, \$125; electric motor, \$290; new pit cars, \$300; steel rails, \$700; development work driving entries, \$9,000.

Empire: Slope and entries driven steadily; box-car loader and additional pump installed.

Morley: One Worthington pump, \$500; sprinkling system, \$6,000; lathe for machine shop, \$800; sixty tons of twenty-five-pound rails for entries, and 7,850 feet of entry driven.

Ludlow: Electric power plant erected.

Wootton: New opening Turner No. 2.

Primero: Sprinkling system, \$5,600; ten tons of twenty-five-pound rails, \$350; 7,863 feet of entry driven.

Sopris: Wiring buildings for lights, \$600; thirty-five tons of forty-pound rails, \$1,100; 50-H.P. motor for washery, \$600; fifty pit cars, \$1,700; sprinkling system, \$4,000; 3,819 feet of entry driven.

Engle: 696 feet of entry driven.

Viola: 1,600 feet of entry.

Starkville: Ventilating fan and motor, \$5,500. No entry driven.

Bowen: Locomotives, pit cars, and other mining equipment, \$5,000.

Gray Creek: Mine fan, Larry cars, pumps, laboratory and equipment, and other mining machinery, \$12,000.

Delagua: Electric power plant and building; tippie and tippie machinery; four sets of track scales; blacksmith shop, tools, and equipment; pit-car scales; addition to stable; doctor's office; sprinkling system; two box-car loaders, and other tools and equipment; \$76,500.

Jewel: Have driven 1,000 feet of entry; installed one Jeffrey mining machine.

Tercio: Sprinkling system, \$3,000; 2,019 feet of entry driven.

Piedmont: Extended electric haulage system.

Cass: Mine office; blacksmith shop, tools, equipment; powder-house; fire apparatus; locomotive; pit cars, and other mining equipment; \$6,000.

Hastings: Fan, electric safety lamps, instruction car, helmets, reviving apparatus, water tank surplus, patrolman clock system, and mining machinery, \$15,000.

Frederick: 9,390 feet of entry driven; sprinkling system, \$1,500.

Berwind: Sprinkling system, \$4,500; Stine fan and motor, \$1,500; fifty pit cars, \$4,000; water tank, \$1,200; electric hoist, \$6,500; 15,395 feet of entry driven.

Tabasco: Sprinkling system; sinking pump; station pump and pipe lines; trap to dump; coke braize; 4,148 feet of entry driven.

Cokedale: Installation of a foreign coal-handling plant; capacity, 1,000 tons per day. Started to open up new mine, to be known as Mine No. 3. The introduction of coal-cutting machines.

Forbes: New screens; 2,000 feet of new entries.

Black Diamond: The improvements and development work done during the year were prospecting for the upper veins by putting upraises; also by putting manholes on the slope and having them whitewashed.

Greenville: Opened same vein across canon in SW $\frac{1}{4}$, SW $\frac{1}{4}$, Sec. 31. Land belonging to D. M. H. Installed electricity for fan power and new mine hoist. Installed 3 x 10 Cole fan, driven by 15-H.P. motor. Sunk airshaft face eleventh east entry as air intake.

Toller: Drove third slope parallel to main slope, to be used as air-split and man-way. Equipped main shaft hoist to work with electricity in conjunction with steam. Equipped electric hoist 30-H.P. to pull coal from dip entries off fifth north. Installed electric safety lamps.

Southwestern: Water-pumping and filtration plant installed, supplying water for camp and steam plant. Three electric hoisting engines installed: one 60-H.P. hoist on the outside, and two 50-H.P. hoists inside mine workings. New shaking screens, electrically driven, installed. Two new openings made;

one on the lower vein and one on the upper vein. Coal being taken from both openings at present time.

Baldy: New air-shaft finished.

Alta: Main entry driven 600 feet. Plane and tippie built in December, 1910. Cost of improvements, about \$10,000.

Brodhead No. 9: Two and one-half mile tram; 2,000 feet of main entry; change in hauling from steam to electric.

Royal: Reopening the main shaft and air-shaft; pumped the water out of mine; cleaned the old entries and air-courses, and cleaned the mine of gas; drove new slopes and entries; installed a powerful fan; built a tippie; put in scales; built a boiler- and engine-house.

LA PLATA COUNTY

Hesperus: Installation of mine telephone system; 246½ yards of main entry.

City: Upraise to old workings for ventilation and escape-way.

Perin's Peak: Installed small fifteen-horsepower hoist; also electric drill for rock.

MESA COUNTY

Nearing: Some entry work; about 100 feet of tunnel.

P. V.: Drove new slope 500 feet.

Palisade: None, except regular entry driving and the construction of incline plane to lower coal from hill works.

Stokes: Driving down slope 100 feet.

Grandview: One cross-entry for air, almost completed; one twenty-foot air-stack.

Garfield: Main slope extended; new rooms opened; new air-course to outside, now almost completed.

PITKIN COUNTY

Gulch: Sprinkling system; 1,845 feet of entry driven.

ROUTT COUNTY

Juniper: Electric plant; new compressor; new fan; new inside electric hoist; 100 new pit cars; new blacksmith shop; new wash-house; ten new cottages; concrete water tank, holding 35,000 gallons, for domestic use and fire protection.

Electric: A double entry has been driven in the ten-foot seam 600 feet, and is abandoned in the meantime. Five hundred feet of entry has been driven in the seven-foot seam, and have now four rooms.

WELD COUNTY

Alpha: Shaft sunk 200 feet, and about 2,000 feet of entries and crosscuts driven.

Parkdale: Installed new electric pump; electric lights in buildings.

Warwick: Built a mine bath-house; also a terrace and cook-house.

Firestone: 500 feet of entry driven; eleven rooms turned; new shaft commenced November 16; top work done and down twelve feet.

Andrew: About 1,000 feet of underground development; sunk shaft, 8 x 16 feet, 340 feet depth; and, in fact, done all the greater part of our necessary development work, with exception of big machinery, railroad scales, and equipment for large shaft.

Shamrock: 300 feet of entry, and opened six rooms.

Tables 8 to 24, inclusive, show by counties the names of mines and operators, the post-office addresses of the mines, the thickness of the coal-beds under operation, the kind of openings, the character of the coal, the total number of days worked, the average number of men employed, and the total production of each mine for the year of 1911.

TABLE 8
BOULDER COUNTY

Name of Mine	Name of Operator	Post-Office Address or Location of Mine	Thickness of Coal-Bed Under Operation	Kind of Opening	Character of Coal	No. of Days Worked	Average No. of Men Employed	Total Produc- tion, (Tons of 2,000 lbs.)
Simpson	Rocky Mountain Fuel Co.	Lafayette	7½ ft.	Shaft	Lignite	149	119.6	122,386
Vulcan	Rocky Mountain Fuel Co.	Lafayette	6 ft.	Shaft	Lignite	138	51.4	57,541
Mitchell	Rocky Mountain Fuel Co.	Lafayette	6 ft.	Shaft	Lignite	35	38.5	6,046
Rex No. 1	Rocky Mountain Fuel Co.	Louisville	6½ ft.	Shaft	Lignite	165	81.6	79,077
Rex No. 2	Rocky Mountain Fuel Co.	Louisville	5 ft.	Shaft	Lignite	246	24.2	20,519
Hecla	Rocky Mountain Fuel Co.	Louisville	5 ft.	Shaft	Lignite	168	74.3	52,644
Industrial	Rocky Mountain Fuel Co.	Superior	6 ft.	Shaft	Lignite	214.5	115.1	82,961
Gorham	Rocky Mountain Fuel Co.	Gorham	6 ft.	Slope	Lignite	212.5	91.2	71,975
Standard	Standard Coal & Land Co.	Lafayette	6 to 9 ft.	Shaft	Lignite	244	118.6	133,653
Monarch No. 1	National Fuel Co.	Downer	3½ to 7 ft.	Shaft	Lignite	249	128.2	96,361
Monarch No. 2	National Fuel Co.	Broomfield	4½ to 9 ft.	Shaft	Lignite	197.5	50.6	42,586
Capitol	Colorado Capitol Coal Mining Co.	Lafayette	6 ft.	Shaft	Lignite	232.5	85.5	54,519
Nonpareil	Brooks-Harrison Fuel Co.	Louisville	9 to 10 ft.	Shaft	Lignite	275	26.1	26,846
Fox	Fox Coal Mining Co.	Gorham	8 ft.	Shaft	Lignite	226	47.3	25,663
Centennial	Centennial Coal Co.	Louisville	6 ft.	Shaft	Lignite	250	28	14,121
Summit	Russell-Gates Mining Co.	Lafayette	5 ft.	Shaft	Lignite	257	22.3	13,158

TABLE 9

DELTÀ COUNTY

Name of Mine	Name of Operator	Post-Office Address or Location of Mine	Thickness of Coal-Bed Under Operation	Kind of Opening	Character of Coal	No. of Days Worked	Average No. of Men Employed	Total Production, (Tons of 2,000 lbs.)
Matchless	Matchless Coal Co.....	Louisville	4 to 6 ft.	Shaft	Lignite	219	40.6	14,647
Sunnyside	Big Six Coal Co.....	Louisville	5 ft.	Shaft	Lignite	291.5	23.2	10,208
Strathmore	Strathmore Fuel Co.....	Lafayette	6 to 10 ft.	Shaft	Lignite	273	26	8,878
Senator	American Fuel Co.....	Lafayette	7½ ft.	Shaft	Lignite	135	13	3,000
Total number of mines in operation.....						206.9	1,208.3	936,802
DELTA COUNTY								
King	Juanita Coal & Coke Co.....	Bowie	9 to 14 ft.	Slope	Bituminous	177	66.4	51,695
Farmer	Paonia Coal Co.....	Paonia	7 to 9 ft.	Drift	Bituminous	237	6.8	4,230
Cedaradge	Surface Creek Co-Operative Coal Co.	Cedaradge	7 to 8 ft.	Slope	Bituminous	318	5	4,078
Black Diamond	Cowan Coal Co.....	Paonia	16 ft.	Drift	Bituminous	150.5	4	2,952
Leroux Creek	Leroux Creek Coal Co.....	Hotchkiss	.....	Slope	Bituminous	35	2	350
Hotchkiss	Hotchkiss Fuel & Supply Co.....	Hotchkiss	.....	Drift	Bituminous	65	2	325
Total number of mines in operation.....						163.7	86.2	66,630

TABLE 11

FREMONT COUNTY

Name of Mine	Name of Operator	Post-Office Address or Location of Mine	Thickness of Coal-Bed Under Operation	Kind of Opening	Character of Coal	No. of Days Worked	Average No. of Men Employed	Total Produc- tion, (Tons of 2,000 lbs.)
Rockvale	Colorado Fuel & Iron Co.	Rockvale	3½ to 4 ft.	Shaft	Semi-bituminous	187.7	440.5	193,287
Coal Creek	Colorado Fuel & Iron Co.	Coal Creek	3 to 3½ ft.	Slope	Semi-bituminous	203.3	220	116,620
Fremont	Colorado Fuel & Iron Co.	Williamsburg	5 to 5½ ft.	Shaft	Semi-bituminous	139.6	276.2	101,722
Chandler	Victor-American Fuel Co.	Chandler	4½ to 5 ft.	Shaft	Semi-bituminous	156.1	172.6	75,853
Radiant	Victor-American Fuel Co.	Radiant	3 ft. 10 in.	Slope	Semi-bituminous	184	69.8	33,839
Magnet	Rocky Mountain Fuel Co.	Williamsburg	4½ ft.	Slope	Semi-bituminous	163.2	91.5	38,687
Emerald	Williamsburg Slope Coal Co.	Williamsburg	2½ to 3¼ ft.	Slope	Semi-bituminous	200	48.4	19,407
Colorado Central	Colorado Central Coal & Mining Co.	Canon City	5 ft.	Shaft	Semi-bituminous	277	34.6	18,321
Royal Gorge	E. G. Beltis	Canon City (4 veins)	3½ ft. to 6 ft. 4 in.	Slope	Semi-bituminous	203	36	16,076
Williamsburg Slope	Donnelly Coal Co.	Florence	3¼ ft.	Slope	Semi-bituminous	154	8	3,233
Brookside	Brookside Coal Co.	Canon City	3½ ft.	Slope	Semi-bituminous	107	19.2	3,017
Willie	Samuel Petry	Florence	8 ft.	Slope	Semi-bituminous	201	6.1	2,922
Total number of mines in operation						181.3	1,422.9	623,041

Total number of mines in operation..... 12

TABLE 13

GUNNISON COUNTY

Name of Mine	Name of Operator	Post-Office Address or Location of Mine	Thickness of Coal-Bed Under Operation	Kind of Openings	Character of Coal	No. of Days Worked	Average No. of Men Employed	Total Produc- tion, (Tons of 2,000 lbs.)
Somerset	Utah Fuel Co.....	Somerset	25 ft.	Slope	Bituminous	271.5	197	274,528
Crested Butte.....	Colorado Fuel & Iron Co.....	Crested Butte	5 to 14 ft.	Drift	Bituminous	187.1	180.2	107,255
Florester	Colorado Fuel & Iron Co.....	Crested Butte	3 to 3½ ft.	Slope	Anthracite	165.7	132.8	54,613
Kubler	Rocky Mountain Fuel Co.....	Baldwin	5½ ft.	Drift	Semi-bituminous	102.2	45.4	18,795
Alpine	Rocky Mountain Fuel Co.....	Baldwin	5½ to 7 ft.	Shaft	Semi-bituminous	3	74	920
			Upper, 15 ft.;					
Porter	Littell Coal & Mining Co.....	Crested Butte	lower, 8 ft.	Drift	Bituminous	258	51.2	55,510
Horace	Pueblo Fuel & Mining Co.....	Crested Butte	2½ ft.	Slope	Anthracite	155	23.7	9,385
Bulkley	Crested Butte Coal Co.....	Crested Butte	7 ft.	Slope	Bituminous	217	35	47,288
Total number of mines in operation.....						169.9	739.3	568,294

TABLE 14

HUERFANO COUNTY

Name of Mine	Name of Operator	Post-Office Address or Location of Mine	Thickness of Coal-Bed Under Operation	Kind of Opening	Character of Coal	No. of Days Worked	Average No. Employed of Men	Total Produc- tion, (Tons of 2,000 lbs.)
Robinson	Colorado Fuel & Iron Co.	Walsen	4½ to 6 ft.	Slope	Bituminous	100.4	294.4	297,520
Walsen	Colorado Fuel & Iron Co.	Walsen	5 to 6 ft.	Slope	Bituminous	126.1	187	101,998
Rouse	Colorado Fuel & Iron Co.	Rouse	6 to 7 ft.	Slope	Bituminous	176.6	266	189,206
Lester	Colorado Fuel & Iron Co.	Lester	5 to 8 ft.	Slope	Bituminous	168.6	270.5	144,750
Pictou	Colorado Fuel & Iron Co.	Pictou	3½ to 10 ft.	Slope	Bituminous	196.8	197.2	102,551
Ideal	Colorado Fuel & Iron Co.	Ideal	3 to 4 ft.	Slope	Bituminous	166	134	73,897
Cameron	Colorado Fuel & Iron Co.	Farr	2½ to 5 ft.	Slope	Bituminous	218.4	93.8	46,011
Hezron	Colorado Fuel & Iron Co.	Hezron	5 ft.	Slope	Bituminous	120.8	73.8	38,104
Ravenwood	Victor-American Fuel Co.	Ravenwood	2½ to 3 ft.	Slope	Bituminous	249	125.5	68,967
Maitland	Victor-American Fuel Co.	Maitland	4½ ft.	Slope	Bituminous	183	86.6	55,805
Oakdale	Oakdale Coal Co.	Oakview	14 ft.	Slope	Bituminous	210	186.5	192,963
Pryor	Union Coal & Coke Co.	Pryor (2 veins)	4 ft. & 6 to 7 ft.	Slope	Bituminous	133.9	131	89,906
Big Four	Big Four Coal Co.	Tloga	7 to 8 ft.	Slope	Bituminous	150.5	64.9	49,967
Tolter	Fruith & Autrey	Walsenburg	3½ ft.	Slope	Bituminous	166.5	87	47,445
Huerfano	Huerfano Coal Co.	Walsenburg	4½ ft.	Shaft	Bituminous	152.3	86.4	47,298
Pinon	Rocky Mountain Fuel Co.	McGuire	5 ft.	Shaft	Bituminous	118	88.8	41,800

Rugby	Rugby Fuel Co.	Rugby	4 ft.	Slope	Bituminous	215	58.9	41,333
Tioga	Minnequa Coal Co.	Tioga	7 ft.	Slope	Bituminous	136.8	62.2	41,132
Sunnyside	Sunnyside M. Coal Co.	Strong	5½ ft.	Slope	Bituminous	117	69.2	39,768
Globe	National Fuel Co.	Farr	3 ft.	Shaft	Bituminous	189	77.4	24,070
Gordon	Gordon Coal Co.	Walsenburg	5½ and 3 ft.	Slope	Bituminous	133	50.5	22,959
Round Oak	Alliance Coal Co.	Ravenwood	.3 ft. 2 in. & 4½ ft.	Slope	Bituminous	113.4	38.3	17,625
Reliance	Alliance Coal Co.	Oakview	6 to 11 ft.	Slope	Bituminous	289.5	18.1	5,301
Loma	Loma Fuel Co.	Walsenburg	2 ft. 10 in.	Slope	Bituminous	146	40.4	10,522
Breen	Breen Coal Mining Co.	Walsenburg	6 ft.	Slope	Bituminous	137	20.8	10,415
Black Canon	New Maitland Coal Co.	Walsenburg	3 2-3 ft.	Slope	Bituminous	87.4	23.5	9,305
Caddell	Black Canon Fuel Co.	Walsenburg	4½ ft.	Slope	Bituminous	110.4	27.4	8,624
Beacon	Colorado Coal Selling Co.	Strong	6 ft.	Slope	Bituminous	64	19	2,775
Turner	Turner Coal Co.	Strong	8 ft.	Slope	Bituminous	42	32.5	2,600
Bunker Hill	Bunker Hill Coal Co.	Rouse	5 ft.	Drift	Bituminous	25	45	2,303
Rockland	Walsenburg Fuel Co.	Walsenburg	6 ft.	Shaft	Bituminous	20	40	500
Total number of mines in operation.....							147.5	2,996.6
								1,728,420

Total number of mines in operation..... 31

TABLE 15

JACKSON COUNTY

Name of Mine	Name of Operator	Post-Office Address or Location of Mine	Thickness of Coal-Bed Under Operation	Kind of Opening	Character of Coal	No. of Days Worked	Average No. of Men Employed	Total Produc- tion, (Tons of 2,000 lbs.)
Coalmont ..	Northern Colorado Coal Co.	Hebron ..	65 ft.	Slope	Semi-bituminous	40	25	1,000
Total number of mines in operation.....		1				40	25	1,000

TABLE 16

JEFFERSON COUNTY

Name of Mine	Name of Operator	Post-Office Address or Location of Mine	Thickness of Coal-Bed Under Operation	Kind of Opening	Character of Coal	No. of Days Worked	Average No. of Men Employed	Total Produc- tion, (Tons of 2,000 lbs.)
White Ash	Rooney White Ash Coal Co.	Morrison	11 ft.	Shaft	Lignite	151	6.3	935
Total number of mines in operation.....		1				151	6.3	935

TABLE 17

LAS ANIMAS COUNTY

Name of Mine	Name of Operator	Post-Office Address or Location of Mine	Thickness of Coal-Bed Under Operation	Kind of Opening	Character of Coal	No. of Days Worked	Average No. Employed	Total Produc- tion, (Tons of 2,000 lbs.)
Berwind	Colorado Fuel & Iron Co.	Berwind	4½ to 6½ ft.	Drift	Bituminous	270	555.4	372,130
Frederick	Colorado Fuel & Iron Co.	Valdez	5 to 9 ft.	Drift	Bituminous	202.3	378.9	335,401
Morley	Colorado Fuel & Iron Co.	Morley	4½ to 8 ft.	Slope	Bituminous	200.5	355.7	274,785
Primero	Colorado Fuel & Iron Co.	Primero	6 to 9 ft.	Drift	Bituminous	213.5	321.8	233,349
Starkville	Colorado Fuel & Iron Co.	Starkville	6 to 7 ft.	Drift	Bituminous	213	355.6	168,361
Sopris	Colorado Fuel & Iron Co.	Sopris	3½ to 4½ ft.	Drift	Bituminous	281.7	207.5	151,185
Tercio	Colorado Fuel & Iron Co.	Tercio	4 to 6 ft.	Drift	Bituminous	273	139.3	102,266
Tobasco	Colorado Fuel & Iron Co.	Tabasco	6 to 8 ft.	Slope	Bituminous	274.5	96.8	91,164
Engle	Colorado Fuel & Iron Co.	Engleville	5 to 7 ft.	Drift	Bituminous	17.6	154	14,550
Delagua	Victor-American Fuel Co.	Delagua	5 to 7 ft.	Slope	Bituminous	252	611.3	494,548
Hastings	Victor-American Fuel Co.	Hastings	4 to 9 ft.	Slope	Bituminous	284.9	550.4	286,369
Bowen	Victor-American Fuel Co.	Bowen	5 to 6 ft.	Drift	Bituminous	247	208.5	249,197
Gray Creek	Victor-American Fuel Co.	Gray Creek	3 to 5 ft.	Drift	Bituminous	275.7	157.3	159,271
Cass	Victor-American Fuel Co.	Delagua	5 ft.	Drift	Bituminous	67	61.6	14,388
Piedmont	Rocky Mountain Fuel Co.	Piedmont	3½ to 7 ft.	Slope	Bituminous	264	196.9	228,346
Majestic	Rocky Mountain Fuel Co.	Majestic	4 ft. 6 in. to 9 ft.	Drift	Bituminous	300	87.1	86,188

TABLE 17—Concluded

LAS ANIMAS COUNTY

Name of Mine	Name of Operator	Post-Office Address or Location of Mine	Thickness of Coal-Led Under Operation	Kind of Opening	Character of Coal	No. of Days Worked	Average No. of Men Employed	Total Produc- tion, (Tons of 2,000 lbs.)
Cokedale	Carbon Coal & Coke Co.....	Cokedale	6 ft.	Slope	Bituminous	299	293.6	295,955
Toller	Cedar Hill Coal & Coke Co.....	Tollerburg	5 to 6 ft.	Shaft	Bituminous	200	130	145,158
Greenville	Cedar Hill Coal & Coke Co.....	Ludlow	5 to 6 ft.	Slope	Bituminous	212	106.6	91,815
Black Diamond	Cedar Hill Coal & Coke Co.....	Cedarhurst	3 ft. 8 in.	Slope	Bituminous	68.9	29.2	7,485
Forbes	Chicosa Fuel Co.	Forbes	4 ft.	Drift	Bituminous	200.5	155.6	108,159
Kenneth	Chicosa Fuel Co.	Tabasco	4 ft.	Drift	Bituminous	250	55.3	74,414
Wootton-Turner	Wootton Land & Fuel Co.....	Wootton	5 ft.	Drift	Bituminous	272.4	134.5	138,731
Beacon	National Fuel Co.....	Beacon	3 ft. 8 in. to 4 ft. 8 in.	Slope	Bituminous	186	94.8	53,357
Thor	National Fuel Co.....	Bowen	5 to 6 ft.	Drift	Bituminous	160	90.1	52,641
Empire	Empire Coal Mining Co.....	Agular	5 to 7 ft.	Slope	Bituminous	298.7	75.3	75,250
Ludlow	Huerfano Coal Co.....	Ludlow	4 to 5 ft.	Drift	Bituminous	181.8	139.1	61,149
Southwestern	Southwestern Fuel Co.....	Agular	4 and 3 ft.	Slope	Bituminous	196.5	81.5	37,542
Rapson No. 1	Rapson Coal Mining Co.....	Rugby	3½ to 4 ft.	Slope	Bituminous	152	51.6	29,855
Primrose	Primrose Coal Co.....	Rugby	3 ft. 4 in.	Slope	Bituminous	168	62.2	29,561
Viola	Johnston Coal & Coke Co.....	Trinidad	3 ft.	Drift	Bituminous	211	24.7	27,540
Bloom	Jeffreys Coal Mining Co.....	Trinidad	5 ft.	Drift	Bituminous	298	21.1	24,214

Jewel	Ideal Fuel Co.....	Agular	3½ ft.	Slope	Bituminous	169.7	47	20,656
McLaughlin	McLaughlin Bros. Coal Co.....	Trinidad	3½ to 6 ft.	Slope	Bituminous	230.5	37.5	17,609
Brodhead No. 9.....	Rider Coal Co.....	Brodhead	4 to 4½ ft.	Slope	Bituminous	107	43.3	8,780
Alta	Alta Fuel Co.....	Brodhead	4 ft. 7 in.	Drift	Bituminous	97	17.6	6,730
Baldy	Baldy Coal Co.....	Trinidad	5 to 7 ft.	Slope	Bituminous	213	8.8	5,969
Royal	Royal Fuel Co.....	Agular	6½ ft.	Shaft	Bituminous	122	35.2	5,883
Congo	Congo Coal Mining Co.....	Agular	2 ft. 4 in.	Drift	Bituminous	54	20.4	1,684
Star	Star Coal Mining Co.....	Cedarhurst	3 ft. 3 in.	Drift	Bituminous	26	17	949
Brodhead No. 4.....	Las Animas Coal Co.....	Brodhead	4 ft.	Slope	Bituminous	27	14	640
Total number of mines in operation.....						197	5,839.1	4,532,664

TABLE 18

LA PLATA COUNTY

Name of Mine	Name of Operator	Post-Office Address or Location of Mine	Thickness of Coal-Bed Under Operation	Kind of Opening	Character of Coal	No. of Days Worked	Average No. of Men Employed	Total Produc- tion, (Tons of 2,000 lbs.)
Perin's Peak	Calumet Fuel Co.	Durango	5 ft.	Drift	Bituminous	207.5	79	54,494
Hesperus	Porter Fuel Co.	Durango	5 ft.	Drift	Semi-bituminous	127.2	37.2	22,444
San Juan	Carbon Coal & Coke Co.	Durango	5 ft.	Drift & Slope	Bituminous	157	16.7	16,419
City	Royal Coal & Coke Co.	Durango	2½ ft.	Tunnel	Bituminous	249	24.3	14,279
Total number of mines in operation.....							157.2	107,236

TABLE 20

MONTEZUMA COUNTY

Name of Mine	Name of Operator	Post-Office Address or Location of Mine	Thickness of Coal-Bed Under Operation	Kind of Opening	Character of Coal	No. of Days Worked	Average No. of Men Employed	Total Produc- tion, (Tons of 2,000 lbs.)
Spencer	Mancos Fuel Co.....	Mancos	3 ft. 4 in. to 4 ft.	Drift	Lignite	150	5	1,255
Total number of mines in operation						150	5	1,255

TABLE 21

PITKIN COUNTY

Name of Mine	Name of Operator	Post-Office Address or Location of Mine	Thickness of Coal-Bed Under Operation	Kind of Opening	Character of Coal	No. of Days Worked	Average No. of Men Employed	Total Produc- tion, (Tons of 2,000 lbs.)
Spring Gulch	Colorado Fuel & Iron Co.....	Spring Gulch	5½ to 10 ft.	Slope	Bituminous	199	120	102,059
Total number of mines in operation.....						199	120	102,059

TABLE 22

RIO BLANCO COUNTY

Name of Mine	Name of Operator	Post-Office Address or Location of Mine	Thickness of Coal-Bed Under Operation	Kind of Opening	Character of Coal	No. of Days Worked	Average No. of Men Employed	Total Produc- tion. (Tons of 2,000 lbs.)
Lion Canon	W. S. Montgomery.....	Meeker .....	.....	Drift	Bituminous	100	2	50
Total number of mines in operation.....	1					100	2	500

TABLE 23

ROUTT COUNTY

Name of Mine	Name of Operator	Post-Office Address or Location of Mine	Thickness of Coal-Bed Under Operation	Kind of Openings	Character of Coal	No. of Days Worked	Average No. of Men Employed	Total Produc- tion, (Tons of 2,000 lbs.)
Oak Hills.....	Moffat Coal Co.....	Oak Hill	7 to 10 ft.	Slope	Bituminous	259	104.3	118,215
Pinnacle	Routt County Fuel Co.....	Oak Creek	16 ft.	Drift	Bituminous	182	87.2	117,825
Juniper	Juniper Coal Co.....	Oak Creek.....	4 to 11 ft.	Slope	Bituminous	282	65.2	67,038
Yampa Valley.....	Yampa Valley Coal Co.....	Oak Creek	12 to 14 ft.	Drift	Bituminous	259	50.2	63,022
Electric	Junction City Coal Co.....	Oak Creek.....	6 ft.	Drift	Bituminous	119	21	5,954
No. One	W. J. Schnessler.....	Oak Creek.....	5 to 12 ft.	Drift	Bituminous	35	2	273
Total number of mines in operation.....							180.3	372,325

TABLE 25

COKE PRODUCTION, 1911, BY COMPANIES AND COUNTIES

Companies	Total Num- ber of Ovens	Total Tonnage	Counties	Total Num- ber of Ovens	Total Tonnage
Colorado Fuel & Iron Co.....	1,828	734,443	Las Animas	2,310	916,949
Carbon Coal & Coke Co.....	350	144,412	Gunnison	154	21,063
Victor-American Fuel Co.....	286	59,097	.....	.....	.....
	2,464	937,952		2,464	937,952

TABLE 26

PRODUCTION BY COUNTIES FOR 1911 AND 1912, SHOWING INCREASE
AND DECREASE

Counties	1911	1912	Increase	Decrease
Boulder	936,802	1,053,091	116,289	.....
Delta	66,630	65,218	.....	1,412
El Paso	331,995	341,885	9,890	.....
Fremont	623,044	733,188	110,144	.....
Garfield	166,686	178,456	11,770	.....
Gunnison	568,294	559,127	.....	9,167
Huerfano	1,728,420	1,889,300	160,880	.....
Jackson	1,000	38,799	37,799	.....
Jefferson	935	83,442	82,507	.....
Las Animas	4,532,664	4,770,292	237,628	.....
La Plata	107,236	121,111	13,875	.....
Mesa	92,384	103,476	11,092	.....
Montezuma	1,255	.....	.....	1,255
Pitkin	102,059	74,182	.....	27,877
Routt	372,325	441,002	68,677	.....
Rio Blanco	500	.....	.....	500
Weld	495,306	489,379	.....	5,987
Mines not reporting, prod- uct estimated	70,000	75,000	5,000	.....
Total tonnage	10,197,595	11,016,948		
Increase in 1912, ...			819,353	

TABLE 27

SHOWING BY COMPANIES TOTAL PRODUCTION AND NUMBER OF MEN EMPLOYED FOR EACH FATAL AND NON-FATAL ACCIDENT DURING THE YEAR 1912

Name of Company or Operator	No. Men Employed	Total Production	No. Fatal Accidents	No. Men Employed per Fatal Accident	No. Non-Fatal Accidents	No. Men Employed per Non-Fatal Accident	No. Men Employed per Fatal Accident	No. Men Employed per Non-Fatal Accident
Alliance Coal Co.....	63	30,667	..	..	2	31.5	..	..
Alpha Coal Co.....	19.1	5,469	..	..	..	..	..	..
Alta Coal Co.....	12.4	6,895	1	12.4	2	6.2	..	..
Amador Fuel Co.....	5.1	2,853	1	5.1	..	..	..	..
American Fuel Co.....	466.3	274,424	1	466.3	5	93	..	..
Baldy Coal Co.....	7.6	5,499	..	..	2	3.8	..	..
Baldwin Star Coal Co.....	7.5	4,531	..	..	..	..	..	..
Bettis, E. G.....	58	34,803	..	..	..	..	..	..
Big Four Coal Co.....	47.9	55,826	..	..	9	5.3	..	..
Big Six Coal Co.....	34	19,272	..	..	1	34	..	..
Black Canon Coal Co.....	24.4	18,778	2	12.2	..	..	..	..
Book Cliff Coal Co.....	11.6	11,677	..	..	..	..	..	..
Breen Coal Co.....	26.8	23,133	..	..	1	26.8	..	..
Brooks-Harrison Fuel Co.....	27	30,677	..	..	..	..	..	..
Brookside Coal Co.....	10.8	4,222	..	..	..	..	..	..

Bunker Hill Coal Co.....	29	4,750	..	..	..	..
Calumet Fuel Co.....	72.1	62,309	1	72.1	..	..
Cannon Coal Co.....	31.1	23,066	..	..	..	..
Carbonado Coal Co.....	22.4	4,710	..	..	..	..
Carbon Coal & Coke Co.....	224.8	278,528	2	112.4	9	25
Cedar Hill Coal & Coke Co.....	235	225,994	5	47	8	29.4
Chicosa Fuel Co.....	45	52,163	1	45	11	4.5
Colorado Central Coal & Mining Co.....	28.3	7,191	2	14.1	..	..
Colorado Fuel & Iron Co.....	5,033.8	3,516,103	17	296.1	64	78.7
Consolidated Coal & Coke Co.....	181	141,323	..	..	6	30
Coryell Mine Leasing Co.....	54.4	72,955	..	..	..	..
Cowan Coal Co.....	5.6	3,663	..	..	..	..
Crested Butte Coal Co.....	27.3	35,218	1	27.3	4	6.3
Curtis Coal Mining Co.....	59.5	46,086	..	..	..	..
Donnelly Coal Co.....	9	5,020	..	..	..	..
El Paso Land & Fuel Co.....	57.7	60,472	..	..	4	14.4
Empire Coal Co.....	45.5	54,649	..	..	..	..
Firestone Coal & Land Co.....	43.8	19,355	..	..	..	..
Frederick Coal Co.....	51.5	47,999	..	..	..	..
Fruith & Autrey.....	73.9	52,003	1	73.9	1	73.9
Grand View Coal Co.....	7	4,503	..	..	1	7
Garfield Coal Mining Co.....	6.9	5,786	..	..	..	..
Gordon Coal Co.....	43.9	25,507	..	..	..	..
Grand Junction Mining & Fuel Co.....	51.9	62,226	1	51.9	1	51.9

TABLE 27—Continued

(5)

FIFTEENTH BIENNIAL REPORT

SHOWING BY COMPANIES TOTAL PRODUCTION AND NUMBER OF MEN EMPLOYED FOR EACH FATAL AND NON-FATAL ACCIDENT DURING THE YEAR 1912

Name of Company or Operator	No. Men Employed	Total Production	No. Fatal Accidents	No. Men Employed per Fatal Accident	No. Non- Fatal Acci- dents	No. Men Employed per Non- Fatal Acci- dent
Hotchkiss Fuel & Supply Co.....	2	270	..	..	..	..
Huerfano Coal Co.....	199.1	125,492	3	66.3	2	99.5
Ideal Coal Co.....	14.9	14,107	..	..	..	..
Ideal Fuel Co.....	36.8	15,586	1	36.8	7	5.3
Jeffries Coal & Mining Co.....	14.7	16,243	..	..	..	..
Johnston Coal & Coke Co.....	32.6	12,230	..	..	..	..
Juanita Coal & Coke Co.....	63.5	56,733	..	..	1	63.5
Juniper Coal Co.....	67.1	59,090	2	33.5	..	..
La Veta Coal Co.....	5	1,400	..	..	..	..
Leroux Creek Coal Co.....	1	253	..	..	..	..
Leyden Coal Co.....	214.3	52,336	1	214.3	2	107
Littell Coal & Mining Co.....	53.5	45,026	..	..	1	53.5
Loma Fuel Co.....	16.6	13,465	..	..	..	..
McLaughlin Bros.' Coal Co.....	71.2	45,365	..	..	2	35.2
Minnequa Coal Co.....	49.7	44,219	..	..	5	10

Moffat Coal Co.....	212.8	191,732	2	106.4	15	14.1
Monument Valley Coal Co.....	3.7	1,638	..	..	..	..
National Fuel Co.....	509.8	462,981	3	169.9	52	9.8
New Grand Mesa Coal Co.....	12.5	1,179	..	..	..	..
New Maitland Coal Co.....	21.6	15,889	..	..	..	..
Northern Colorado Coal Co.....	53.2	38,799	..	..	3	17.7
Oakdale Coal Co.....	202.7	222,364	3	67.6	2	101.3
Palisade Coal & Supply Co.....	19.2	10,313	..	..	..	..
Patterson Coal Co.....	27.5	23,117	..	..	..	..
Samuel Petry	6	3,142	..	..	..	..
Pike's Peak Fuel Co.....	140.1	153,847	..	..	3	47
Porter Fuel Co.....	37.9	25,066	..	..	..	..
Primrose Coal Co.....	85.7	48,094	1	85.7	2	42.3
Pueblo Fuel & Mining Co.....	30.5	13,996	..	..	..	..
P. V. Coal Co.....	5.8	3,427	..	..	..	..
Rapson Coal Mining Co.....	90.4	68,369	..	..	5	18.8
Rider Coal Co.....	80.8	51,970	..	..	..	..
Rocky Mountain Fuel Co.....	1,376.6	1,189,424	14	98.3	53	26
Rooney White Ash.....	6.3	1,106	..	..	..	..
Routt County Fuel Co.....	78.1	109,549	1	78.1	8	9.8
Royal Fuel Co.....	41	45,050	2	20.5	2	20.5
Royal Coal & Coke Co.....	21	12,704	..	..	..	..
Rugby Fuel Co.....	56.2	48,973	..	..	6	11.2
Russell Gates Mining Co.....	27.5	22,509	2	13.7	..	..

TABLE 27—Concluded

SHOWING BY COMPANIES TOTAL PRODUCTION AND NUMBER OF MEN EMPLOYED FOR EACH FATAL AND NON-FATAL ACCIDENT DURING THE YEAR 1912

Name of Company or Operator	No. Men Employed	Total Production	No. Fatal Accidents	No. Men Employed per Fatal Accident	No. Non- Fatal Acci- dents	No. Men Employed per Non- Fatal Acci- dent
Shamrock Coal Co.....	12.6	10,346	..	..	..	..
South Canon Coal Co.....	71	32,514	2	35.5	1	71
Southern Colorado Coal Co.....	80.8	51,970	1	80.8	..	..
Southwestern Fuel Co.....	63	32,836	1	63	5	13
Star Mining Co.....	15	1,400	..	..	..	..
State Coal Co.....	22.6	5,694	..	..	..	..
Stokes, Walter	8.5	4,365	..	..	..	..
Sunnyside Coal Mining Co.....	70.5	50,119	..	..	3	23.5
Surface Creek Co-Operative Coal Co.....	5	3,886	..	..	2	2.5
Tudor Coal Co.....	13.2	10,720	..	..	..	..
Turner Coal Co.....	35	3,000	..	..	..	..
Union Coal & Coke Co.....	102.2	100,440	..	..	3	34
Utah Fuel Co.....	212	266,504	..	..	9	24
Victor-American Fuel Co.....	1,720	1,526,877	23	75	31	55.5

Walsenburg Fuel Co.....	40.5	22,780	..	..	..	..
Williamsburg Slope Coal Co.....	60.5	20,174	..	..	..	..
Wootton Land & Fuel Co.....	161.3	138,666	..	..	..	..
Yampa Valley Coal Co.....	89.1	80,625	..	1	89.1	..
			—	—	—	—
State of Colorado.....	13,980.6	11,016,948	98	142.66	326	39.3

TABLE 28

PRODUCTION BY COMPANIES—FATAL AND NON-FATAL
ACCIDENTS, 1912

Name of Company	Tons per Fatal Accident	Tons per Non-Fatal Accident
Alpha Coal Co. ....	.....	27,095
Alliance Coal Co. ....	.....	15,300.33
Amador Fuel Co.	2,853	.....
American Fuel Co.	274,424	54,885
Baldy Coal Co. ....	.....	2,749.5
Big Four Coal Co. ....	.....	6,203
Big Six Coal Co. ....	.....	19,272
Black Canon Coal Co.	9,389	.....
Breen Coal Co. ....	.....	23,133
Calumet Fuel Co.	62,309	.....
Carbon Coal & Coke Co.	139,264	27,853
Cedar Hill Coal & Coke Co.	45,199	28,299.2
Chicaso Fuel Co.	52,163	5,216.3
Colorado Central Coal & Mining Co.	3,595.5	.....
Colorado Fuel & Iron Co.	206,829.6	54,939.1
Consolidated Coal & Coke Co. ....	.....	23,554
Crested Butte Coal Co.	35,218	8,804.5
El Paso County Land & Fuel Co. ....	.....	15,118
Fruith & Autrey	52,003	52,003
Grand Junction Mining & Supply Co.	62,226	62,226
Huerfano Coal Co.	41,830	62,746
Ideal Fuel Co.	15,586	2,236.6
Juanita Coal & Coke Co. ....	.....	56,733
Juniper Coal Co.	29,548	.....
Leyden Coal Co.	82,396	41,168
Littell Coal & Mining Co. ....	.....	45,026
McLaughlin Bros.' Coal Co. ....	.....	22,682.5
Minnequa Coal Co. ....	.....	8,944
Moffat Coal Co.	95,866	12,782.1
National Fuel Co.	154,327	8,903
Northern Colorado Coal Co. ....	.....	12,933
Oakdale Coal Co.	74,121.3	111,182.5
Pike's Peak Fuel Co. ....	.....	51,282.3
Primrose Coal Co.	48,004	24,002

TABLE 28—Concluded

PRODUCTION BY COMPANIES—FATAL AND NON-FATAL
ACCIDENTS, 1912

Name of Company	Tons per	Tons per
	Fatal Accident	Non-Fatal Accident
Rapson Coal Mining Co.....	.....	13,674
Rocky Mountain Fuel Co.....	84,244.4	22,612
Routt County Fuel Co.....	109,549	13,693.6
Royal Fuel Co.	22,525	.....
Royal Coal & Coke Co.....	.....	6,252
Rugby Fuel Co. ....	.....	9,795
Russell Gates Mining Co.....	11,234.5	.....
South Canon Coal Co.....	16,257	32,514
Southwestern Fuel Co.	32,836	6,567
Sunnyside Coal Mining Co.....	.....	16,706.3
Surface Creek Co-operative Coal Co.....	.....	1,943
Union Coal & Coke Co.....	.....	33,480
Utah Fuel Co. ....	.....	29,611.5
Victor-American Fuel Co.	66,342.5	49,254.1
Yampa Valley Coal Co.....	.....	80,625
State of Colorado	112,417.84	30,946.45

TABLE 29

SHOWING BY COMPANIES NUMBER KILLED AND INJURED PER 1,000
EMPLOYED

Name of Company	No. Men Employed	No. Killed	No. In- jured
		per 1,000 Employed	per 1,000 Employed
Alta Coal Co.	12.4	80.6	161.2
Amador Fuel Co.	5.1	196	.....
American Fuel Co.	466.3	2.1	.....
Black Canon Fuel Co.....	24.4	82	.....
Calumet Fuel Co.....	72.1	13.9	.....
Cedar Hill Coal & Coke Co.....	235	11.4	38.3
Colorado Central Coal & Mining Co.....	28.3	70.7	.....
Colorado Fuel & Iron Co.....	5,033.8	3.4	12.7
Chicosa Fuel Co.	45	22.2	222.2
Carbon Coal & Coke Co.....	224.8	8.9	41.2
Crested Butte Coal Co.....	27.3	36.6	146.5
Grand Junction Mining & Supply Co.....	51.9	19.3	19.3
Huerfano Coal Co.....	199.1	15.1	10.4
Ideal Fuel Co.	36.8	27.2	190.2
Juniper Coal Co.	63.5	31.5	.....
Leyden Coal Co.	214.3	46.6	9.3
Moffat Coal Co.	212.8	9.4	70.5
National Fuel Co.	509.8	5.9	102
Oakdale Coal Co.	202.7	14.8	9.8
Primrose Coal Co.	85.7	11.7	23.3
Rocky Mountain Fuel Co.....	1,376.6	10.2	38.5
Routt County Fuel Co.....	78.1	13	102.4
Royal Fuel Co.	41	49	.....
Russell Gates Mining Co.....	27.5	72.7	.....
Southern Colorado Coal Co.....	80.8	12.4	.....
Southwestern Fuel Co.....	63	16	79.4
Victor-American Fuel Co.....	1,720.6	13.4	18
South Canon Coal Co.....	71	28.2	.....
Fruith & Autrey.....	73.9	13.5	13.5
Utah Fuel Co.....	212	.....	42.4
Union Coal & Coke Co.....	102.2	.....	29.3
Rugby Fuel Co.....	56.2	.....	88.9
Pike's Peak Fuel Co.....	140.1	.....	21.4

TABLE 29—Concluded

SHOWING BY COMPANIES NUMBER KILLED AND INJURED PER 1,000
EMPLOYED

Name of Company	No. Men Employed	No. In- jured	
		No. Killed per 1,000 Employed	No. In- jured per 1,000 Employed
Grand View Coal Co.....	7	.....	143
Frederick Fuel Co.....	57.5	.....	17.4
Minnequa Coal Co.	49.7	.....	100.6
McLaughlin Bros.' Coal Co.....	71.2	.....	28
El Paso County Land & Fuel Co.....	57.7	.....	69.3
Alliance Coal Co.	63	.....	31.6
Surface Creek Co-operative Coal Co.....	5	.....	400
Littell Coal & Mining Co.....	53.5	.....	18.7
Baldy Coal Co.	7.6	.....	263
Consolidated Coal & Coke Co.....	181	.....	33.2
Sunnyside Coal Mining Co.....	70.5	.....	42.5
Royal Coal & Coke Co.....	21	.....	95.2
Northern Colorado Coal Co.....	53.2	.....	56.4
Yampa Valley Coal Co.....	89.1	.....	11.2
Big Four Coal Co.....	47.9	.....	187.1
Rapson Coal Mining Co.....	90.4	.....	55.3
Big Six Coal Co.....	34	.....	29.4
Breen Coal Co.	26.8	.....	37.3
Juanita Coal & Coke Co.....	63.5	.....	15.7
State of Colorado.....	13,980.06	7.055	25.6

TABLE 30

NUMBER OF FATAL ACCIDENTS IN 1912—CLASSIFICATION

Chargeable to mines	98
Underground	95
Surface	3
Total	98

NUMBER OF FATAL ACCIDENTS—CAUSES AND PERCENTAGE

Causes	No. of Accidents	Per Cent
Fall of rock and coal.....	51	52.0
Mine cars and motors.....	13	13.3
Gas and dust explosions.....	17	17.3
Miscellaneous	17	17.4
Total	98	100.0
Number of widows left.....	51	
Number of children left.....	134	

TABLE 31

NUMBER OF NON-FATAL ACCIDENTS IN AND AROUND THE MINES
IN 1912
CAUSES AND PERCENTAGE

Causes	No. of Accidents	Per Cent
Fall of rock and coal.....	159	44.6
Mine cars and motors.....	96	27.0
Gas and dust explosions.....	6	1.7
Miscellaneous	95	26.7
Total	356	100.0

CLASSIFICATION

Serious	Minor	Trivial
167	156	33
No. Men	No. Killed per 1,000	No. Injured per 1,000
Employed	Employed	Employed
13,890.6	7.065	25.6

TABLE 32

FATAL ACCIDENTS IN 1912

Date	Name of Person	Nationality	Occupation	Age	Single or Number of		Name of Mine	County	Cause of Accident
					Married	Children			
Jan. 5	George Burke	Colored	Miner	35	Married	..	Hastings	Las Animas	Fall of coal
Jan. 15	Jos Anizo	Italian	Miner	43	Married	5	Rockvale	Fremont	Fall of coal
Jan. 19	Narcisco Garcia	Mexican	Miner	44	Married	5	Starkville	Las Animas	Fall of coal
Jan. 22	Henry Beck	American	Track-layer	22	Single	..	Oakdale	Huerfano	Fall of rock
Jan. 23	Anthon Athis	Greek	Machine-helper	21	Single	..	Huerfano	Huerfano	Fall of top coal
Jan. 24	John Smith	Irish	Miner	54	Single	..	Royal	Las Animas	Fall of rock
Jan. 27	Matt Gregorich	Austrian	Miner	26	Single	..	Black Diamond	Las Animas	Fall of rock
Jan. 27	Abram Lubici	Austrian	Miner	44	Married	5	Delagua	Las Animas	Electrocuted
Jan. 31	Rafael Saccomoni	Italian	Not employed	23	Single	..	Royal	Las Animas	Falling down shaft
Feb. 1	Frank Anthony	American	Top-man	46	Single	..	Perry	Routt	Crushed between cars of a loaded trip
Feb. 6	Petco Evanoff	Bulgarian	Miner	32	Single	..	Hecla	Boulder	Fall of rock
Feb. 8	Guiseppi Sassatelli	Italian	Miner	45	Married	5	Robinson	Huerfano	Fall of rock
Feb. 16	Jake Boller	Slav	Timberman	27	Single	..	Ludlow	Las Animas	Fall of rock
Feb. 17	Carmello Cincio	Italian	Miner	22	Married	..	Hastings	Las Animas	Fall of rock
Feb. 19	John McElwee	American	Rope-runner	32	Single	..	Southwestern	Las Animas	Crushed between car and pillar
Feb. 21	Dominic Painchi	Italian	Miner	28	Single	..	Hastings	Las Animas	Fall of rock
Feb. 25	Griffith Powell	Welsh	Miner	25	Single	..	Fremont	Fremont	Fall of rock
Feb. 27	Ernest Morford	American	Miner	33	Married	5	Pinon	Huerfano	Fall of rock
Mch. 6	Frank Orazner	Austrian	Tram-car loader	45	Married	3	Bulkeley	Gunnison	Snowslide falling on him while placing tram car

TABLE 32—Continued

FATAL ACCIDENTS IN 1912

Date	Name of Person	Nationality	Occupation	Single or		Children	Name of		Cause of Accident
				Married	Widowed		Mine	County	
Mich. 8	John Keith	American	Miner	68	Widowed	6	Majestic	Las Animas	Fall of rock
Mich. 14	William Hillier	Welsh	Miner	59	Married	6	Juniper	Routt	Fall of rock
Mich. 25	Fred Acosta	Mexican	Weigh-boss	35	Single		Primrose	Las Animas	Run over by railroad car on tippie
Mich. 25	William Griffith	Welsh	Miner	25	Single		Premont	Premont	Fall of roof
Mich. 26	Frank Stabinger	Austrian	Miner	47	Married	4	Forbes	Las Animas	Run over by a loaded car
Mich. 28	Mike Fargello	Italian	Miner	24	Single		Piedmont	Las Animas	Electrocuted
Mich. 30	Tom Irwin	American	Miner	26	Single		Juniper	Routt	Fall of coal
Apr. 2	Peter Pipan	Slov	Miner	33	Married	1	Berwind	Las Animas	Fall of rock
Apr. 4	Frank Zewerdowski	Pole	Track-layer	51	Married	6	Primero	Las Animas	Fall of rock
Apr. 12	Robert Lister	Scotch	Miner	36	Married	3	Cokedale	Las Animas	Fall of rock
Apr. 25	Emilio Gomez	Mexican	Timberman and driver	35	Married	3	Alta	Las Animas	Fall of top coal
May 3	Giocomo Tornuvacco	Italian	Miner	23	Single		Morley	Las Animas	Leg cut off by being caught in coils of rope
May 4	Steve Trifonoff	Bulgarian	Cager	21	Single		Puritan	Weld	Fall of coal
May 14	Chris Jacobson	Swede	Box-car man	41	Married	2	Monarch No. 1	Boulder	Run over by a trip of cars
May 17	Louie Kalb	Austrian	Machine-runner	35	Married	1	Matchless	Boulder	Fall of slate
May 21	Silverio Velo	Mexican	Miner	33	Married		Delagua	Las Animas	Crushed between car and drop
May 25	Kuruchi Okimoto	Japanese	Miner	27	Single		Ludlow	Las Animas	Fall of rock
May 27	John Davis	Colored	Miner	52	Married		Kubler	Gunnison	Fall of top coal

May 23	Phillippo Trujillo	Mexican	Roller tender	44	Married....	7	Pictou.....Huertano.....Run over by a trip of cars
May 30	Tama Sumada	Japanese	Miner	31	Married....	..	Perin's Peak....La Plata.....Fall of coal
June 4	Joe Drab	Slav	Driver	21	Single.....	..	Toller....Las Animas.....Fall of rock
June 8	Alex Tafuya	Mexican	Driver	30	Married....	1	Toller....Las Animas.....Crushed between prop and loaded car
June 12	Antonio Smell	Austrian	Miner	28	Single.....	..	Royal....Las Animas.....Electrocuted
June 17	Silvio Gresselin	Italian	Miner	25	Single.....	..	Tercib....Las Animas.....Fall of rock
June 18	Lorenz Springhetti	Austro-Tyrolese	Pumper	47	Married....	5	Hastings....Las Animas.....Gas explosion
June 18	Ben Bendetti	Austro-Tyrolese	Miner	25	Single.....	..	Hastings....Las Animas.....Gas explosion
June 18	Emanuel Feraazo	Austro-Tyrolese	Miner	25	Single.....	..	Hastings....Las Animas.....Gas explosion
June 18	Jim Velottie	Austro-Tyrolese	Miner	36	Single.....	..	Hastings....Las Animas.....Gas explosion
June 18	Louis Asti	Italian	Driver	28	Married....	1	Hastings....Las Animas.....Gas explosion
June 18	Pete Sertori	Italian	Miner	30	Married....	1	Hastings....Las Animas.....Gas explosion
June 18	Joe Mattina	Italian	Miner	31	Married....	1	Hastings....Las Animas.....Gas explosion
June 18	Pietro Dichiazzo	Italian	Miner	39	Married....	1	Hastings....Las Animas.....Gas explosion
June 18	Bude Orlich	Slav	Miner	40	Married....	1	Hastings....Las Animas.....Gas explosion
June 18	Pete Milrh	Slav	Miner	36	Married....	4	Hastings....Las Animas.....Gas explosion
June 18	George Cgontos	Greek	Rock-man	24	Single.....	..	Hastings....Las Animas.....Gas explosion
June 18	John Thomas	Welsh	Fireboss	40	Married....	3	Hastings....Las Animas.....Gas explosion
June 19	Albert Potts	Colored	Miner	46	Married....	..	Rouse....Huertano Fall of rock
July 2	Amabile Moneghini	Austro-Tyrolese	laborer	27	Single.....	..	Central....Fremont Electrocuted
July 6	Mike Albrico	Italian	Miner	22	Married....	..	Berwind....Las Animas.....Fall of rock
July 11	Andre Kripan	Austrian	Miner	43	Married....	1	Ideal....Huertano Fall of rock
July 13	B. Kawakami	Japanese	Miner	40	Single.....	..	Hastings....Las Animas.....Fall of rock
July 17	Tom Krokowski	Pole	Miner	21	Single.....	..	Piedmont....Las Animas.....Fall of rock

TABLE 32—Concluded

FATAL ACCIDENTS IN 1912

Date	Name of Person	Nationality	Occupation	Age	Single or		Name of	County	Cause of Accident
					Married	Children	Mine		
July 24	Mike Medenica	Montenegrin	Miner	33	Married	2	Brodhead No. 9	Las Animas	Electrocuted
Aug. 12	Joe Brasch	Austrian	Miner	32	Single	..	Leyden	Jefferson	Fall of rock
Aug. 23	Mich Sudan	Austrian	Miner	46	Married	..	Hastings	Las Animas	Fall of rock
Aug. 24	Joseph Vidic	Austrian	Miner	45	Married	4	Oak Hills No. 1	Routt	Run over by mine car
Aug. 26	John Dachoff	Bulgarian	Miner	29	Married	1	Industrial	Boulder	Powder Explosion
Aug. 29	Alfred Rubin	German	Mine boss	48	Married	5	Piedmont	Las Animas	Gas explosion
Aug. 29	William Tweedle	Scotch	Superintendent	53	Married	5	Piedmont	Las Animas	Gas explosion
Sept. 4	Rocco Giovanelli	Austrian	Laborer	32	Single	..	Central	Fremont	Heart failure in mine
Sept. 9	Angelo Siminoff	Bulgarian	Miner	22	Single	..	Industrial	Boulder	Fall of rock
Sept. 14	John Carros	Greek	Timberman	32	Single	..	Summit	Boulder	Fall of slate
Sept. 14	Mike Carstos	Greek	Timberman	34	Single	..	Summit	Huerfano	Struck by fall of slate
Sept. 23	Antonio Banoni	Italian	Miner	22	Single	..	Rouse	Las Animas	Struck by loaded car
Sept. 30	John Roy	Italian	Miner	26	Single	..	Jewel	Boulder	Fall of rock
Sept. 30	Tony Puk	Austrian	Miner	32	Married	2	Oakdale	Huerfano	Fall of top coal
Oct. 1	Anton Zitz	Austrian	Shotfirer	39	Single	..	South Canon	Garfield	Gas and dust explosion
Oct. 1	George Lacy	Austrian	Timberman	48	Married	1	South Canon	Garfield	Gas and dust explosion
Oct. 11	Chris Beljan	Slav	Miner	22	Single	..	Ravenwood	Huerfano	Fall of rock
Oct. 11	Joan Curic	Slav	Miner	32	Married	3	Ravenwood	Huerfano	Fall of rock

Oct. 14	Vincent Mrah	Austrian	Cartman	50	Married....	1	.....	Chandler....	Fremont... Car turning over him
Oct. 14	Battista Tals	Italian	Miner	25	Single.....	..	.....	Caddell....	Huerfano.....Fall of rock
Oct. 14	Frank Griboski	Slav	Miner	44	Widower...	5	.....	Caddell....	Huerfano.....Fall of rock
Oct. 15	Pietro Cornusco	Italian	Miner	45	Married....	..	.....	Robinson....	Huerfano.....Crushed between roof and loaded car
Oct. 19	Charles Knlest	Austrian	Miner	50	Single.....	..	.....	Cameo.....	Mesa.....Fall of slab
Oct. 24	Joe Torsoni	Italian	Miner	33	Single.....	..	.....	Standard....	Boulder.....Crushed between loaded car and rib
Oct. 25	John Smith	Lithuanian	Loader	59	Married....	3	.....	Cameron....	Huerfano.....Fall of rock
Oct. 27	Joe Krankota	Slav	Miner	..	Married....	7	.....	Oakdale....	Huerfano.....Fall of coal
Oct. 28	Marcus Lee	English	Miner	23	Married....	1	.....	Pinnacle....	Routt.....Fall of drawslate
Nov. 8	John W. Higgins	American	Night foreman	45	Married....	1	.....	Simpson....	Boulder.....Gas explosion
Nov. 10	Joe Benedetti	Italian	Miner	38	Married....	5	.....	Toller.....	Las Animas.....Fall of coal
Nov. 22	W. W. La Vergne	American	Pumpman	38	Married....	..	.....	Simpson....	Boulder.....Struck by cage
Nov. 24	Serefano Hustado	Mexican	Mule-driver	38	Married....	2	.....	Cokedale....	Las Animas.....Kicked by mule
Nov. 27	Harry L. Rhodes	American	Stable boss	37	Married....	2	.....	Toller.....	Las Animas.....Electrocuted
Nov. 27	Andrews Simmons	American	Timberman	65	Married....	..	.....	Spring Gulch....	Pitkin.....Fall of coal
Dec. 4	Gavino Vigil	Mexican	Miner	27	Single.....	..	.....	Frederick....	Las Animas.....Crushed between car and pillar
Dec. 6	Joseph Pierson	Colored	Miner	37	Married....	..	.....	Pinon.....	Huerfano.....Fall of rock
Dec. 18	Louis Benossi	Italian	Machine runner	23	Married....	1	.....	Toltec.....	Huerfano.....Cause of death unknown; had come in contact with an insulated wire
Dec. 25	George Xenos	Greek	Driver	22	Single.....	..	.....	Parkdale....	Weld....Run over by a mine car

REPORT OF THE HASTINGS EXPLOSION

Denver, Colorado, July 13, 1912.

Hon. John F. Shafroth,
Governor of Colorado.

Sir: I herewith submit my report to you on the Hastings explosion:

The Hastings explosion occurred on the 18th of June, 1912, at 9:30 p. m., and caused the death of twelve men and injured one man badly.

The mine is situated two miles from Ludlow and fifteen miles nearly due north from the town of Trinidad, Las Animas County, on the Colorado Southeastern Railroad. The property is owned and operated by the Victor-American Fuel Company, with head offices in Denver: W. J. Murray, general manager; William McDermott, division superintendent, and James Cameron, local superintendent; with John Yates as mine boss.

MANNER OF OPENING BY SLOPES

The Hastings mine is opened by three parallel openings. Two of the openings are used as return airways. One of the return airways is the main haulage road, and the other return airway is used as a traveling-way by the men in going to and coming from their work. One of the openings is used as an intake airway.

The new slope to the B seam turns off the main slope at an angle of 35°, 1,300 feet from the surface. The dip of the new slope varies from 5 to 7 per cent, and at a distance of 850 feet off the main slope a rock tunnel is driven down into the lower seam, known as the B seam. The stratum between A and B seams is forty feet.

In this section of the mine the explosion occurred. From the inside of the rock tunnel two parallel entries are driven down the dip a distance of 3,400 feet, from the junction with the third south and main slope. Three pairs of entries are turned off on each side of the slope. The distance of these entries is approximately 500 feet.

Cross-entries are driven to the raise in the second south, also the second north, up a distance of 200 feet. On the third north no cross-entries have yet been started, but on the third south two cross-entries have been driven up a distance of 200 feet. The two parallel slopes are driven below the third north 250 feet.

VENTILATION

The ventilation is produced by a 94" x 72" Sirocco fan. This fan is driven by electric power from Trinidad. The lower speed of the fan is 117 revolutions per minute, producing from 93,000 to 95,000 cubic feet per minute; the higher speed, 220 revolutions per minute, producing from 110,000 to 115,000 cubic feet of air per minute. The fan-house stands 100 feet north of the main haulage slope, and is built of concrete floor, sides, and roof; in fact, it is fireproof. The fan is run as a blowing fan, but can be changed in a few minutes to an exhaust fan.

Two electric motors are installed, and in case anything should go wrong with the electric power applied, or the working motor injured in any way during the day, a change can be made to the other motor, or a different electric power applied, in a few minutes.

A gong at the blacksmith shop gives notice to the men on top whenever the fan stops, and they at once make the change necessary. During the night the fan is visited once every hour by the night watchman, who records his visits. The night engineer also visits the fan every hour.

The new slope, or B seam, is ventilated by a split of air from the main intake at the sixth south, main slope, and the air travels south to a point where the two parallel dip entries begin. On the lower, or B, seam a shaft forty feet in depth is put down, which forms the intake for the B seam. This intake airway lies to the north of the new slope, which is the return airway for the B seam.

MANNER OF CONDUCTING THE AIR ON THE B SEAM

The air is split at the first south. An overcast is built by six twenty-four-inch galvanized pipes, with concrete walls. The air continues down the intake, and at each pair of entries goes in one entry, returning to the main intake on the other entry, and in this manner all the other entries are ventilated; that is to say, only one continuous current around the workings. After the air passes the first south, it returns to the main haulage road to the surface.

MODE OF WORKING

The B seam, or lower seam, is what is known as the Berwind seam. It is five feet thick and is a coking coal. At present the workings in the B seam are not extensive. So far, only entry work has been done, except that on the first south four rooms were turned off; but on account of the coal being bad and faulty, the first and second south, as also the first north, have been abandoned.

MANNER OF HAULAGE

Mules are used in taking coal from the working face to the double partings at the slope. An electric hoist, situated between

the second and third south entries, delivers coal to this point, wherefrom the surface engine takes it to the tippie.

NUMBER OF MEN AT WORK THE NIGHT OF THE EXPLOSION

Thirty men were working in the A seam, or upper seam, the night of the explosion, but only two men felt the shock of the explosion. All the men in the A seam got out of the mine in safety.

On the lower, or B, seam thirteen men were at work that night, and twelve men met death from the effect of the explosion. One man, whose name is George Pappas, a rock man, who was working on the slope near the first north entry, was taken out alive.

PRECAUTIONS TAKEN BY THE COMPANY

Only safety and electric lamps were used in the mine in both seams. Safety lamps were used by the fire bosses and the company's inspectors. Electric lamps were used by the workmen. Permissible powder was used in the mine exclusively. Clay only was used for tamping the holes. Shots were fired by an electric hand battery.

Two fire bosses were employed in the lower, or B, seam. One fire boss inspected the places before the day shift went to work; the other fire boss inspected the places before the night shift went to work.

The company employed an inspector, whose duty it was to inspect the B seam once a day. The company also employed a chief inspector, who inspected the mine two or three times a month.

When the news of the catastrophe reached me at 7:45 a. m. on the morning of the 19th of June, 1912, I was in Trinidad, and, making all possible haste, took the first train and reached the scene of the disaster at 9 o'clock a. m. In company with Mr. McDermott and Mr. Griffith, we entered the mine about 9:30 a. m. and went, by way of the intake, down as far as the third north entry. The helmet men had explored the third north and had located some of the bodies, but the air was so feeble that it could not remove the gas, so the brattice men had to go over the brattice stoppings again. After some time we were able to get into the third north.

Near the inside crosscut we found Pietro Dictuazzo and Joe Mattina, who were burned a little. Going through the crosscut, we discovered a light burning. Thinking it might be a feeder burning, for a moment we stopped while Messrs. Reese and Griffith went to the light, and found it was an electric lamp still burning. An electric lamp had been found burning in the third north by the previous shift.

In turning to the left to go out of the back entry of the third north, I found three bodies about four feet apart, and

farther out the back entry, outside the haulage cross-cut, I found another body; these being all of the bodies of the men found, who had been working in the third north.

I went down into the slopes, as far as I could get for the water, but found nothing there. We then proceeded to the third south entry, to get into which we had to put up a curtain between the third south main and back entries. Getting the gas diluted to the first cross-cut, or run-around, we there found a great quantity of smoke, and, thinking there might be feeders of gas burning under some coal (as this section of the mine gives off gas from feeders in the bottom), we again raised the curtain on the slope, to allow the air to go up the slope, instead of forcing it into the third south.

We then sent the helmet men to make a run into the entries, to ascertain if there was any fire. After waiting some time, the helmet men made the run of the two main entries to the face. In doing so, two of the men were overcome by the exertion of the work.

Not being satisfied, I asked Mr. D. Reese to make the run of the cross-entries; which was done, no fire being discovered.

We again turned the air into the third south back entry, but, the ventilation being feeble, the removal of the gas was very slow. We knew there were yet four bodies to be removed, they having been located by the helmet men. Before the other shift came on, we reached as far into the back entry as the second inside cross-cut. We then returned to the surface at 5:45 p. m. to get our dinner. Before 3 o'clock the next morning the rest of the bodies were found and taken to the surface.

NAMES, NUMBERS, AND LOCATIONS WHERE BODIES WERE FOUND

No. 10, George Cgontos, a rock man; in a cross-cut at the first north back entry; burned on head.

No. 6, Lorenz Springhetti, pump man; near the pump station at the mouth of the return of the third north; badly burned.

No. 3, Pietro Dictuazzo; body found thirty feet outside the inside cross-cut of the third north main entry; burned slightly.

No. 2, Joe Mattina, miner; body found ten feet outside the inside cross-cut of the third north main entry; burned slightly.

No. 4, Ben Benedetto, miner; body found five feet outside the inside cross-cut on the back or return air-way of the third north; very slightly burned.

No. 7, Pete Sertori, miner; body found nine feet outside the inside cross-cut on the back or return airway of the third north; very slightly burned.

No. 1, Jim Vellotti, miner; found fourteen feet outside the inside cross-cut on the back or return airway of the third north; very slightly burned.

No. 5, Emanuel Ferazzo, miner; body found five feet outside from haulage cross-cut on third north back entry; very slightly burned.

No. 9, Pete Milirh, miner; body found in corner of inside cross-cut on third south main entry; badly mangled and burned.

No. 8, Louis Asti, driver; body found at face of third south entry; mangled, but not badly burned.

No. 11, Bude Orlich, miner; body found close to the coal face on the lower side of the third south entry; mangled and burned.

No. 12, John Thomas, fire boss; body found at the mouth of the second cross-cut, off the second cross-entry, off third south; badly burned.

A mule was found twenty feet outside the inside cross-cut on the third south entry, badly burned and the entrails torn out of the body, driven under a rail for ten feet.

EFFECTS OF THE EXPLOSION

On the morning of the 20th of June, in company with the manager of the Victor-American Fuel Company, Mr. W. J. Murray; Mr. McDermott, Mr. Griffith, the company's inspector; Mr. Dalrymple, State Inspector of Coal Mines; Messrs. Oberding and Graham, deputy state inspectors of coal mines; also Mr. Roberts, of the United States rescue car, I entered the mine for the purpose of finding, if possible, the cause of the explosion.

In going down the intake, the effect of the explosion was very slight, except where there was a cross-cut between the intake and the return airways. At all such cross-cuts the force came through, but seemed to be spent on the intake. Very little coking was found on the intake airways, but the force seemed to pass across the intake airway, going into the first north, a distance of 200 feet, with slight coking.

The force of the explosion again crossed the intake at the second north, traveling into the second north 500 feet, going up the first cross-entry to the first cross-cut, and back down the second cross. Force was spent at the bottom of the second cross-entry on the second north entry, slightly coking for the first 300 feet. The force and flame again passed through the intake air, going into the third north main entry to the parting, where some of the cars were thrown from the track. The force seemed to come off the slope, traveling into the third north at a point 200 feet from the slope. A place is turned off to the right and driven a distance of forty feet, and twenty feet from the face we found coke on the roof—not cakes, but in small grains—where it would seem the force had been cushioned with the compressed air and there left its deposit of coke. Stoppings between the third north entries were blown out for a distance of 300 feet from the slope.

At the inside cross-cut the force went into the back entry, returning to the slope intake. The force and flame seemed to travel down the slope for 125 feet, here again spending itself, when nearing the face of the slopes. On the main slope, between the third north main entry and the third south back entry, we found three cars badly smashed, and that the force had driven those cars to the north side of the main slope. The cars were turned around by the force.

It would seem to me that the cars must have been standing on the third south run-around (or the back or intake entry of the third south), and were blown toward the third north, which is nearly opposite at this point. It appears the strongest force came out of the third south intake airway. The force seemed to split here, one part going into the third north, and the other part going up the main slope or the main return.

We then traveled into the third south by way of the intake airway to the face of the entry, and went through the inside cross-cut, which is twenty feet from the face of the third south. At this point the forces seemed to be great, as the men found here were badly mangled and burned, and about twenty feet outside this inside cross-cut the mule was also burned and driven under the track for ten feet. There must have been a shot fired that night in this entry, as the coal was thrown against a car which was standing near the face, and on each side the coal was thrown out past the car for ten feet. Yet it would seem that the explosion must have taken place after this shot was fired, because of the fact that the two entry-men and driver were found close against the coal face, and that some of the drilling tools must have been driven out of the cross-cut onto the main road, showing that the force came from the back entry to the main entry; also because of another fact, namely, that the shots in this section are fired by a hand electric battery, and, according to evidence, that electric battery was found in the first cross-cut on the second cross-entry, off the main third south. The fire boss, as a rule, fires the shots, but on the night shift the mule-driver sometimes fired shots.

The gas was so strong that we could not get any farther on the main third south entry. We started to go out by way of the main slope, but, not being able to get over the falls, we turned back, going out by way of the intake airway to the surface.

On the 21st day of June the gas was not removed from the third south cross-entries, and on the 22nd day of June we again entered the mine. The gas was then removed, so that we could get into the cross-entries off the third south entry. There we found flame marks up near the face of the entry, and a little coking. It was in the second cross-cut of this entry that the fire boss was found. (This entry is called the second cross entry.) He went up to this cross-cut, apparently to put up a

brattice to clean out some gas that was found by the company mine inspector that day.

The lamp which was found near the body of John Thomas must be considered a defective lamp, inasmuch as the asbestos washer on top of the glass cylinder was turned or doubled to the inside a distance of one and one-half inches, which caused an open space between the washer and glass cylinder.

We went up the main slope, which was very badly torn up by the force of the explosion, out to the surface. The force terminated about 150 feet above the fourth south of the A seam. This fourth south is used as a return for a part of the air from the A seam, and this increased volume of air may have been the cause of the termination of the force.

THE CAUSE OF THE EXPLOSION

To my mind, the explosion was caused by gas. Dust did not play much of a part in the explosion, because of the wet condition of the mine. The mine inspector for the company stated that he found a small quantity of gas that day in the blind cross-cut on the second cross of the third south entry. A small quantity of gas might start an explosion with a defective safety lamp placed in it, but a small quantity of gas could not cause such a violent explosion unless the air current was at the explosive point, which could be caused by a derangement of the air current, or by a sudden increase of gas due to a fall of the barometric pressure, or by an outburst of gas, or by encountering a large feeder of gas.

A derangement of the air current could be caused by a door being left open or a canvas curtain torn down, which would prevent the air from going into that section.

Any of the above-stated causes might have occurred the night of the explosion, and the gas might have been of sufficient quantity to have been ignited by John Thomas' defective lamp. I think the defective lamp might have ignited the fire-damp, but I also believe the condition of the air current at the time of the explosion was not due to the negligence of Fire Boss Thomas, as this place was stopped that day on account of gas by the company inspector.

The quantity of air in that section of the new slope was, at the time of the explosion, inadequate to dilute the gases given off and render such gases harmless.

REMARKS

In a mine such as the new slope at Hastings, where such a quantity of gas is generated, the air current should be at all times uniform and continuous. Doors and curtains should be used when it is impossible to conduct the air current otherwise.

I last inspected this mine on May 11, 1912, and at that time I considered the mine in fair condition, but found the quantity

of air was less than on my previous visit. I ordered the cloth curtains repaired at several places, and waited until they were repaired.

The new slope has always generated considerable gas, and I thought it was as well handled as was possible under the system of ventilation in the mine. This mine was inspected by Deputy Inspector Oberding, accompanied by Al Thompson, company inspector, on August 9, 1911. During this inspection the second south entries of the new slope were visited twice. On the first visit no explosive gas was found. Thirty minutes later, upon re-entering those two entries, they discovered fire-damp back to the inner cross-cut—a distance of from fifty to sixty feet from the face. This accumulation was due to a door having been left open, which caused a short circuit in the ventilation. Recommendations were made at this time to have all shooting done by shot-firers after all other employes had left the mine, and that double doors be used to prevent the air from being short-circuited.

Here I wish to thank David Reese and his helmet crew, of the Victor-American Fuel Company instruction car, for the advance runs they made into the third south entries.

[Signed] HENRY P. KING,
Deputy State Coal Mine Inspector.

Approved:

JAMES DALRYMPLE,
State Inspector of Coal Mines.

Married Number
or of

Name	Age	Occupation	Nationality	Single	Children
Lorenz Springhetti	47	Pumper....	Austrian-Tyrolese.....	Married.....	5
Ben Benedetto	25	Miner	Austrian-Tyrolese.....	Single.....	..
Emanuel Ferazzo	25	Miner	Austrian-Tyrolese.....	Single.....	..
Jim Velotti	36	Miner	Austrian-Tyrolese.....	Single.....	..
Louis Asti	28	Driver.....	Italian.....	Married.....	1
Pete Sertori	30	Miner	Italian.....	Married.....	2
Joe Mattina	31	Miner	Italian.....	Married.....	1
Pietro Dietuazzo	30	Miner	Italian.....	Married.....	1
Bude Orlich	40	Miner	Slav.....	Married.....	1
Pete Milirh	36	Miner	Slav.....	Married.....	4
George Cgontos	24	Rockman..	Greek	Single.....	..
John Thomas	40	Fire boss ..	Welsh.....	Married.....	3

VERDICT OF JURY

State of Colorado, County of Las Animas, ss.

An inquisition holden at Trinidad, in Las Animas County, State of Colorado, on the 26th day of June, A. D. 1912, before E. B. Sipe, coroner of said county, upon the bodies of (see list attached), there lying dead, by the jurors whose names are here-to subscribed: Said jurors upon their oaths do say that the above-named persons, whose bodies were taken from the Hastings mine of the Victor-American Fuel Company at Hastings, in said county and state, on or about the 19th day of June, A. D. 1912, came to their death as the result of an explosion in said mine about 9:30 o'clock on the night of June 18, 1912.

From the evidence adduced the cause of said explosion cannot be positively determined. The mine was known to generate explosive gas, but not in dangerous quantities. We further find that the mine was well ventilated. On the afternoon of June 18 a small feeder of gas was discovered in one of the working places in said mine, and the fire boss was ordered to increase the ventilation at that point. It is possible that in doing so he ignited the gas from his lamp. This is made plausible from the fact that after the explosion the lamp of the fire boss was found improperly put together. The explosion might have been the result of any one of several other possible causes, but the present condition of the lamp of the fire boss is the only fact ascertainable which affords any basis for a conclusion as the possible cause of the disaster. The lamp of the fire boss, unlike those of the other employes of the company, which are inspected daily, was entirely in his keeping, and the company is in no wise culpable. As a matter of fact, it was not properly put together and was the real cause of the explosion.

In Testimony Whereof, The said jurors have hereunto set their hands, the day and year aforesaid.

JOHN C. BALDWIN, Foreman;
HENRY ANDREWS,
W. W. JONES,
GABRIEL NICCOLI,
PETER J. BACCO,
REUEL MILLER,

Jurors.

Attest:

E. B. SIPE,

Deputy Coroner of Las Animas County.

REPORT ON THE PIEDMONT EXPLOSION

In the Piedmont mine, owned by the Rocky Mountain Fuel Company, a gas explosion occurred August 29, 1912, in which two men lost their lives: William Tweedale and Alfred Rubin.

The explosion occurred in the part of the Piedmont mine known as the "Frisco," in the first and second south entries, off the Frisco main haulage road and 2,700 feet from the mouth of the Frisco opening. The first and second south entries were driven a distance of 2,000 feet from the main haulage road.

Near the face of these entries the coal became bad and very faulty, and for this reason the entries were stopped. The company then came back 189 feet from the face of the said entries and worked it out to its present distance of 286 feet back from the face.

This procedure caused an open space ninety-seven by ninety-five feet. Inside this open space the two entries are solid, except the three cross-cuts—one at the face and the other two, respectively, 100 and 165 feet back from the face. This large space inside of the pillar was without air, and gas must have accumulated at or near the face of the second south entry.

For some unknown cause, Superintendent Tweedale and Mine Boss Rubin, the former with a carbide lamp and the latter with a safety lamp, went into the inner part of the second south entry. How near to the face of this entry they had gone before the explosion occurred is not known.

On the morning after the explosion, in company with the fire boss, I went into the first and second south entries. I found the safety lamp of the mine boss 165 feet back from the face of the second south entry, and the carbide lamp of the superintendent twenty-three feet nearer to the face.

The bodies had been found where I discovered the lamps. Carlo Bartolo and Lessi Angelini were working in the first south, taking out the pillar between the first and second south. Emil Bessover and Frank Lumcancio were working opposite to the above-mentioned men, taking a skip off the pillar below the second south entry. Carlo Bartolo was blown down, and he stated that he felt a hot wave pass over him. He and the other three men were not injured in any way, but all their lights were extinguished by the force of the explosion. Consequently, they were obliged to walk out in the dark. They stated that they saw the superintendent and the mine boss pass by where they were working a few minutes before the explosion occurred.

As the flame of the gas did not travel out to where these men were working, and the force of the explosion did not extend beyond the first and second south entries, I am of the opin-

ion that the large open space outside of the initial point gave the ignited gas ample room for expansion, and the fact that the dust and the workings of that part of the mine were naturally humid prevented a general dust explosion.

[Signed] HENRY KING,
Deputy State Inspector of Coal Mines.

THE SOUTH CANON EXPLOSION

At the South Canon mine, in Garfield County, owned by the South Canon Coal Company, on October 1, 1912, Anton Zitz and George Lacy lost their lives by a gas and dust explosion, which was caused either by the ignition of fire-damp in Upraise No. 33, Upper East Wheeler, or by blown-out shots fired in Rooms Nos. 7 and 9 in U seam. Dust was the predominating factor in the explosion.

The explosion took place while the shot-firer, Anton Zitz, was in Upraise No. 33, the body of deceased being found in a pit car standing under the chute, and being covered with coal from the upraise shots.

On January 16, 1912, this mine was inspected by F. N. Oberding, deputy inspector, and found in a dusty condition, with fire-damp in Room No. 26. The following recommendations were made at that time:

1. That a sprinkling system be installed, whereby dust can be laid and kept damp on haulage roads, sides, and roof.
2. That fire-damp in Room No. 26 be removed as soon as possible.
3. That air volume be increased.
4. That another door be put on main haulage-way.

On May 8, 1912, this mine was again inspected by Deputy Oberding, and recommendation made that water line be extended and kept near the face of U seam, and that sprinkling should be done diligently.

On September 18, 1912, Deputy Oberding and Chief Inspector Dalrymple inspected the mine and found fire-damp in two inside upraises, ventilation destroyed by motor breaking one door, and the other door being in very poor condition. The mine was considered dangerous.

The recommendations of January 16 and May 8, with reference to wetting down the dust, had not been carried out when Anton Zitz and George Lacy met their death.

JAMES DALRYMPLE,
State Inspector of Coal Mines.

THE SIMPSON MINE

A fatal accident occurred in the Simpson mine, November 8, 1912, in which John Higgins, night foreman, lost his life.

The accident occurred in Room No. 3 on main back south entry. Deceased and four other men were fighting a gob fire, which broke out in the above room, generating an explosive gas, carbon monoxide, CO, which exploded, seriously burning I. W. Griffith, mine foreman, John Thompson, and John D. Smith; also burning William Powell slightly, and causing the death of John W. Higgins.

The gas may have ignited from the lamps, as they were using a naked light; or it may have been caused by a fall of rock, which drove the gas on gob fire, thereby igniting it and causing an explosion. This part of the mine has not been worked for several years.

Statement of I. W. Griffith, mine foreman: "I believe that the gob fire was in Room No. 3, on main back south entry; that the fire generated a gas which exploded, the gas being ignited by the gob fire."

Statement of William Powell: "I think the fire was in Room No. 2, main back south entry, and that the explosion was caused by Marsh gas, CH₄, being ignited by gob fire."

In my opinion, naked lights should not be used in fighting gob fires, as under certain conditions these fires generate an explosive mixture.

[Signed] JAMES W. GRAHAM,
Deputy State Inspector of Coal Mines.

MINE FIRE

On Saturday morning, April 13, 1912, at 10 o'clock, a fire occurred at the Monarch No. 1 mine, belonging to the National Fuel Company, at which the fan, the fan-house, and about sixty feet of trestle work were destroyed.

At the time of the fire there were five men and twenty mules in the mine. The men got out safely, but the mules were all suffocated by the smoke from the fire.

The fan house is located about fifty feet from the ashes and cinder piles which are dumped from the boiler-house. It is supposed that some hot ashes or cinders were blown and lodged in the fan-house which caused the fire.

JAMES W. GRAHAM,
Deputy.

IMPROVEMENTS IN 1912

BOULDER COUNTY

Nonpareil: Nothing but narrow work.

Sunnyside: Installed one sixteen-foot fan, with engine and covering. Underground development: entry, 3,389 feet; room turn, 639 feet; cross-cut, 757 feet; narrow work, 4,785 feet. Re-barred shaft bottom with sixty-five-pound rails; laid diamond switch (south side); retimbered main south entry; purchased ten new pit cars and one mule; erected new rock trestle and dump, also new top landing; erected new custom chute; erected new slack hopper under main chutes to catch boiler coal; repaired old boiler, welded steam cylinder on compressor, and overhauled air end on same; purchased one Ingersoll puncher. Would state a large portion of our narrow work has been driven for haulage-ways; the hard bottom has been graded from 20 to 30 inches and coal roof has been left.

Fox: Extended south entry, first, second and third west entries, and first southeast entry.

Centennial: Installed single-motion engine, a Norwalk compressor, and one boiler. Development: general extension in entries and clearing up old rooms.

Capitol: 1,955 feet of entries driven; 8,300 feet of narrow room work; 1,465 feet of entry caves cleaned up and timbered; two overcasts built; one barn, 19 x 112 feet, timbered and partitioned into stalls.

Senator: Putting down new slope to make new opening escape for mine.

Monarch No. 2: Box-car loader installed, and new bunk-house.

Summit: Installed one portable compressor; capacity, 175 feet per minute. Drove 2,515 feet of entry and 610 feet of west entry.

Standard: Several thousand feet of development work done in the southwest and southeast parts of the mine; new fourteen-foot fan installed; motor generator; six-ton electric haulage.

Gorham: Normal amount of development work.

Industrial: Normal amount of narrow work.

Hecla: Normal amount of narrow work; new rock dump, at expense of \$750.

Mitchell: New boarding-house and wash-house.

Rex No. 1: No special improvements.

Rex No. 2: Driving one pair of exploration entries.

Vulcan: Normal amount of narrow work.

Simpson: Grade drainage from the south boundary to foot of shaft; replacing block stoppings with concrete and stone stoppings; headframe and tippie entirely rebuilt; self-dumping cages; car haul at bottom of shaft.

DELTA COUNTY

Black Diamond: One tramway half-mile long; one large bridge 541 feet long and seventy feet high; one Lorrying drum; 5,000 feet of rope.

Cedaredge: Main entry driven 140 feet; upraise, 4 x 4, driven forty feet to surface for air-shaft.

Leroux Creek: Driving entries and turnings rooms.

King: Built stone archway to protect pit mouth; installed telephone in mine; ordinary work of driving entries and turning rooms.

EL PASO COUNTY

Williamsville: None reported.

Patterson: 300 feet of entry work.

El Paso: 5,522 feet of entry; 2,061 feet of cross-cut; timbering.

Danville: No report.

Pikeview: Building and plant, miners' cottages, and about \$18,500 development work. Total cost of improvements, \$33,865.88.

FREMONT COUNTY

Emerald: 200 feet opened up, two more entries from slope.

Radiant: Installed one mine ventilating fan; painted all houses inside and out; mine development pushed. Entire cost of improvements and mine development, \$10,000.

Chandler: Four-room tenant-house; one mine ventilating fan; improvements and addition to tippie and tippie machinery; painting tenant-houses inside and out; mine development. Cost of improvements and developments, \$20,000.

Coal Creek: Sunk shaft 412 feet, and have almost completed installation of machinery to hoist coal through shaft instead of slope; 9,700 feet of entry driven. Equipment consists of electrical hoist, fan motor, new headframe, tippie, shaking screens, weight basket, four railroad scales, office, five tenant-houses, Bishop, car-shop, storehouse, transformer, and power lines.

Fremont: Twenty-five more pit cars; 4,170 feet of entry driven.

Rockvale: Heavier power line in mine; new slope for man-way and air-course; new fan; 8,550 feet of entry driven.

Royal Gorge: 350 feet of new slope, new tippie, and wagon chute.

Magnet: Installed complete mine telephone system and electric-lighted traveling way, and installed new electric pumps.

On surface a bath-house, to accommodate seventy-five men, was built, equipped with hot and cold sprays; also three new tenement-houses have been erected. Development work equal to amount of coal extracted.

GARFIELD COUNTY

South Canon: Slope started on pitch of vein in middle of canon, driven down ninety feet on Wheeler vein. Stopped for the winter. Rock cross-cut from Wheeler vein on east upper lift to get around No. 56 from the old works. This tunnel is 430 feet long from point where we left Wheeler vein to point where we again struck it. Also extended the E vein on the west side to 1,000 feet from entry mouth.

Vulcan: Development of Allen vein both east and west for about 1,500 feet; new 125-H.P. boiler; motor generator; six-ton electric locomotive; shaking screens; four four-room houses; new office.

GUNNISON COUNTY

Baldwin Star: Drove entries and air-courses, aggregating about 300 feet. This is a "wagon mine" and employs an average of only about eight men.

Bulkley: Drove about 2,000 feet of new entries and air courses, including opening of new vein. No. 3 vein nearly exhausted. Will file map of work in new vein (No. 4) as soon as survey can be made.

Floresta: Twenty-five additional pit cars; two gasoline locomotives; telephone system; new haulage engine and compressor; 1,640 feet of entry driven.

Crested Butte: New tippie and slack bin to replace old; 770 feet of entry driven.

Kubler: Development work done equal to amount of coal extracted.

Somerset: Escape-way driven to surface from face of sixth east entry; concrete pump station constructed at foot of slope; concrete overcasts erected at seventh, eighth, and ninth east entries; twenty concrete and three rock stoppings erected at various points; five steel doors with concrete frames erected on manway; 8,403 feet of double entry driven, with attendant cross-cuts.

HUERFANO COUNTY

Toltec: 4,000 feet of entry work; tippie remodeled.

Primrose: New opening one-half mile above old mine, and tramway to same (electric); drift in 500 feet—parallel air-course.

Loma: 2,000 feet of entry driven; one seven-foot Stine fan.

Reliance: Built twenty houses, fan-house, boiler- and engine-room; installed air compressor, hoist, three boilers, fan; drove slope 400 feet, with air-course; drove manway 400 feet; drove about 3,500 feet of entry and air-courses.

Pryor: Electric pump.

Oakdale: Drove 2,000 feet of entry; sunk slope 320 feet.

Turner: Ladder in air-shaft; 400 feet of entry work.

Black Canon: We sunk the slope 260 feet; drove one entry 400 feet; have put in a new pump; also telephone.

Carbonado: Sinking shaft; depth, fifty-two feet; dimensions, 7.8" x 6'. Planning all equipment and six houses. Installing machinery; one 82-H.P. Leyner electric hoist and one coal-cutting electric machine installed November, 1912. Names of seams: Lennox and Maitland. Commenced producing coal August 2, 1912.

Sunnyside: Removed and reconstructed fan-house and fan engine; new shaft to discharge air by fan in new location; fifty-eight feet of new entry; reconstructed water tank; new Sullivan coal-cutting machine; \$4,500 on buildings.

Rugby: Installed a seven-foot disc fan at Opening No. 3.

Caddell: Main slope driven 780 feet; second north entry driven 300 feet; third north entry driven 200 feet; fourth north entry driven 500 feet; placed overcast on main slope for air; turned thirty new rooms.

Maitland: Miners' electric safety lamps; new opening; mine telephone; electric haulage engine; electric boxcar loader; electric fan; substation building; substation equipment; mine development. Cost of improvements and developments, \$40,000.

Ravenwood: Eight four-room tenant-houses; one five-room tenant-house; one six-room tenant-house; mine telephone; electric hoist; electric signal system; tipple improvements; development work; substation building and equipment. Cost of improvements and development, \$15,000.

Rockland: Drove about 6,000 feet of entries and air-courses; sunk air-shaft 640 feet; erected fan-house and new fan, etc.

Walsen: Shaking screens and motor; one more railroad-track scale; box-car loader; hoist motor and coupling; transformers and switchboard; two mining machines; power lines, and 600 feet of entry driven. Cost, \$26,000.

Cameron: New mule barn and corral; forty additional pit cars; 7,400 feet of entry driven.

Robinson: Slack conveyor and elevator, and 4,900 feet of entry driven.

Picton: Three inside electric hoists installed; now installing electrical machinery and equipment to run entire plant with power from Trinidad Power Company, and do away with present boiler plant and steam equipment; 12,000 feet of entry driven.

Ideal: 3,900 feet of entry driven.

Lester: 3,600 feet of entry driven.

Breen: Installed a Jeffrey 5-A mining machine, a pneumo-electric puncher, railway spur to mine, and set of Fairbanks scales.

Tioga: 630 feet of development work; are installing two 125-H.P. boilers.

Pinion: Installed, in mine, fire protection; on surface, "first aid to injured" equipment; also electric lighting system on surface.

Big Four: Installed a large mine pump to take care of water in main slope; also a slack blower to carry the slack coal away.

JACKSON COUNTY

The Coalmont: This property was opened some time in the summer of 1909, and since then until June, 1912, its operations have been confined chiefly to development work. It is owned and operated by the Northern Colorado Coal Company. Mr. E. R. Miller is president of the company, and Mr. Donald B. Cameron superintendent. The post-office address of the mine is Coalmont. The property is situated in North Park, Jackson County, 112 miles southwest of the town of Laramie, Wyoming, and is connected with the Laramie, Hahn's Peak & Pacific Railroad. It consists of 4,080 acres, located in Sections 10, 11, 12, 14, 15, 21, 22, 23, 24, and 26, Range 7 North, 81 West; Range 7 North, 80 West. It contains four workable seams or coalbeds, as follows: Upper or Mammoth seam, sixty-five feet thick; No. 2 seam, twelve feet thick and at a depth of 650 feet below the upper seam; No. 3 seam, eighteen feet thick and 600 feet below No. 2 seam; and No. 4 seam, twenty feet thick and 350 feet below No. 3 seam. The character of the coal is semi-bituminous, and the measures dip northeast on an angle of twenty-six degrees. The mine is opened by a slope, and is worked on the "room and pillar" method, with centers of fifty feet. The ventilation is natural. The coal is shot off the solid, and black powder is used. The opening and all development work are on the southeast quarter of Section 24. The surface improvements consists of a store, a warehouse, an amusement hall, a boarding-house, a doctor's office, a superintendent's dwelling, and thirty-two other houses. The equipment of the mine comprises one second-motion Ottumwa hoist of 100-H.P.; two boilers of 100 H.P. each; one link-belt coal conveyor of 200 tons' capacity per hour; one Phillips' kick-back tippie endless chain haulage, to convey the empty cars back to the slope. The mine is equipped for a capacity of 1,200 tons daily. The scale of wages paid is classified as follows: outside work, 28 cents per hour, and inside work, 30 cents per hour. The coal is shipped to Denver, Wyoming, and Nebraska. The following is an analysis of the Mammoth seam:

Fixed carbon	44.22
Volatile matter	43.18
Moisture	8.50
Ash	4.10

1,850 feet of entry driven; sunk air-shaft, and equipped same with ladders and stack; installed pump at bottom of slope; also mine telephone and electric signals. Surface developments and improvements included erecting tippie, with conveyor and conveyor engine, car-haul and car-haul engine.

JEFFERSON COUNTY

Leyden No. 2: This shaft, which was destroyed by fire, has been recovered. The upper and lower parts are lined with concrete, making the shaft practically fireproof. Shaft bottom is lined with concrete. Surface plant has been reconstructed and is fireproof. Buildings, including headframe and tippie, are constructed of concrete and steel.

Leyden No. 3: This shaft, sunk since the fire, is 791 feet deep and 21' 2" x 9' clear. Top and bottom are lined with reinforced concrete, making the shaft substantially fireproof. Shaft bottom will also be lined with concrete and steel. Surface plant is entirely fireproof. All building, including headframe and tippie, being constructed of reinforced concrete and steel. Equipment includes a 1,000-H.P. boiler plant, a 24" x 42" hoisting engine, with 9' drum, large air compressor, generator, etc. Shaft airway is equipped with a 96" x 68" Sirocco fan. General equipment: For the storage of rescue equipment and the training of rescue corps, a fireproof concrete building has been built; rescue equipment consists of oxygen helmets, pulmotor, storage battery, electric lamps, etc.

Rooney White Ash: Sunk main shaft fifty-five feet deeper; air-shift 4' x 6'; two dwellings; 240-foot bridge, and grading for railroad connection with Colorado & Southern.

LA PLATA COUNTY

Perin's Peak: Extended main entry and parallel 1,500 feet; opening up new territory as needed; installed new hoist, transformer house, escape-way, and air-shaft; new school building.

City: 400 feet of entry; 300 feet of airway.

Hesperus: 200 yards of main entry work.

San Juan: About 700 feet of double entry in new territory.

LAS ANIMAS COUNTY

Cokedale: Opening up a new mine on the east side of Reilly Canon, to be known as Cokedale Mine No. 2. Constructing electric haulage tracks from said mine to new tippie. This installation will be equipped for a daily production of 1,000 tons per day.

Alta: First north entry driven about 300 feet, and new air-course constructed.

Empire: Additional pumps and pipe lines installed; new steam hoist installed; addition built to power-house; slope and entries driven.

Jewel: 600 feet of entry.

McLaughlin: New fan; 30-H.P. D. C. motor; Saderan A. C. mining machinery; four tenement-houses.

Wootton & Turner: 5,000 feet of entry and development work.

Hastings: Substation building, pumps, and additional drainage system; changing large proportion of steam-driven machinery to electric; straightened slope to B seam; installed safety lamps; extensive development on B or lower seam. Total cost of improvements, approximately \$30,000.

Bowen: Fireproof substation; fireproof electric shop; double track in main entry; painting tenant-houses; mine development; established adobe dust treatment. Cost of improvement and development, \$5,000.

Gray Creek: One Stine fan; electric machine and hoist; fireproof substation; also electric lighting for mine and camp; extensive development of new mine opening. Cost of total improvement, \$25,000.

Delagua: Carpenter shop, tools, and equipment; mine telephone; dust-blower and motor; addition and improvement on tenement-houses; adobe shelves in mine to hold dust. Cost of development work, \$10,000.

Black Diamond: Drove upcast 125 feet to upper vein, and sunk shaft on surface to same vein.

Toller: Set Stearn engine to act as auxiliary to motor for fan drive; set double drum hoist at fifth north entry for haulage; set hoist to sink slope.

Morley: 8,700 feet of entry driven. No additional equipment installed.

Starkville: One fifteen-ton electric locomotive.

Sopris: Completed opening of new slope; installed new fan to replace old one at old mine; also new fan at new slope; 5,200 feet of entry driven.

Tercio: One six-ton gas locomotive in mine; disintegrator engine in washery; addition to sprinkling system in mine; 5,650 feet of entry driven.

Amador: During six months ending November 30, 1912, 200 feet of main entry.

Primero: New fan installed at east side of mine; partial installment of electric lamps for miners; 4,200 feet of entry driven.

Tabasco: Completed opening up new slope; installed main haulage engine and one inside electric hoist; 6,000 feet of entry driven.

Berwind: Two electric pumps and motors; additional fan; 15,000 feet of entry driven.

Frederick: Forty-eight additional pit cars; 10,600 feet of entry driven.

Segundo: Two bins for rewashed washer waste, and rebuilt old larry bins.

Southwestern: Motor generator set, and two electric machines installed; seventy-five new pit cars placed in service.

Royal: Box-car loader installed; improvements on shaft and air-shaft; cage put in air-shaft to hoist men out.

Beacon: Slope of No. eleven mine driven; camp-houses repainted; four new houses built.

Brodhead No. 9: About 2,000 feet of narrow work.

Ludlow: About 8,000 feet of entry work.

Wootton (Turner): 5,000 feet of entry and development.

Forbes: Installed mine telephone system; new stable on surface; installed two gasoline hauling motors, and five electric-driven Morgan-Gardner mining machines.

Piedmont: Installed complete mine telephone system and fire-extinguisher for fire protection in the mine; installed "first aid to the injured" equipment and rescue apparatus on surface.

MESA COUNTY

Stokes: One new shoot; one new screen; two double partings.

Garfield: Air-courses and main slope extended.

Grand View: Air-course 300 feet.

Cameo: Retimbered tunnel, and put on concrete portal; installed 75-H.P. motor for fan; widened air-shaft and air course, and put ladder in shaft.

Palisade: Finished incline 800 feet long in mine.

PITKIN COUNTY

Gulch: 1,360 feet of entry driven.

ROUTT COUNTY

Yampa Valley No. 1: Main plane hoisting engine or drum installed outside, and new rope for plane; drum-house; snow-sheds over plane; sidetrack at top of plane; sixty new pit cars; new work in mines, etc. Total cost, \$20,000.

Yampa Valley No. 2: Installed 2,000 feet of tramway from mine to top of plane, with two large trestles; two hoisting engines; two parallel entries in mine, 500 feet each; and prospecting other veins; at total cost of \$15,000.

Oak Hills (1): Underground development shown by maps.

Argo (2): Underground development shown by maps.

Pinnacle: Opened up No. 3 Mine; installed electric plant, and installed revolving screen.

Juniper: Installed two 150 H.P. tubular boilers and slack conveyor; built ten new houses for miners; 1,400-foot tunnel, developing upper veins; developed 1,000 feet on main slope, and opened 1,200 feet of entries.

Routt-Electric: Installation of power plant, steam, 150 H.P. capacity; tiple; shaking and revolving screen; storage bins; railroad connection and trackage; system of water works;

office and store buildings; scales; 400-foot escape-way, and ventilating shaft to surface.

WELD COUNTY

Baum: Entries, cross-cuts, and room necks.

Ideal: Put in 80-H.P. boiler; put down a well for water 400 feet; built scale-house, and covered the tipple.

Shamrock: 500 feet of entry.

Evans: Built new engine-room and boiler-room; installed one compressor and one boiler; 1,000 feet of entry; one new pump.

Firestone: Sunk new hoisting shaft, 107 feet deep, 14' x 7'; installed ventilating fan.

Frederick: New tipple hoisting engine.

A BRIEF DESCRIPTION OF SOME OF THE NEW MINES OPENED IN 1911 AND 1912

Star: Located between Rugby and Rapson mines on outcrop, Las Animas County. Drift opening at right angle from true dip. Walsen seam, lower portion three feet three inches. Coal: non-coking bituminous. Colorado & Southern Railway connection one-fourth mile from tippie. Ventilated by furnace. Volume of air, 4,000 feet.

Breen: This mine is located about one-half mile west of the town of Walsenburg, in Section 8, Township 28 South, Range 66 West. It contains eighty acres, and is connected with the Colorado & Southern Railway. The property is operated by the Breen Coal Company. The mine is opened by a slope, driven on the Walsen seam which is six feet thick. The character of the coal is non-coking bituminous. The coal is undercut by machines, operated by electricity, and the mine is ventilated by furnace.

Carbonado: Is located in Huerfano County, and is operated by the Carbonado Coal Mining Company. Shaft: depth, 52 feet; dimensions, 7.8" x 6'. Planning all equipment and six houses. Installing machinery; one 82-H.P. Leyner electric hoist and one coal-cutting electric machine installed November, 1912. Names of seams: Lennox and Maitland. Commenced producing coal August 2, 1912.

Loma: Huerfano County. Opened 1911, and is situated one mile west of Walsenburg; is a wagon mine. Slope opening on Cameron seam. Furnace ventilation.

Alpha: Weld County. Opened in 1911, and is situated one and one-half miles west of Fort Lupton, on the Denver, Laramie & Northwestern Railway. Shaft opening to seam. Natural ventilation.

Tables 33 to 47, inclusive, show, by counties, the names of mines and operators, the post-office addresses of the mines, the thickness of the coal-beds under operation, the kind of openings, the character of the coal, the total number of days worked, the average number of men employed, and the total production of each mine for the year of 1912.

TABLE 33

BOULDER COUNTY

Name of Mine	Name of Operator	Post-Office Address or Location of Mine	Thickness of Coal-Bed Under Operation	Kind of Opening	Character of Coal	No. of Days Worked	Average No. of Men Employed	Total Production, (tons of 2,000 lbs.)
Standard	Rocky Mountain Fuel Co.	Lafayette	6 to 9 ft.	Shaft	Lignite	224	109.1	106,981
Simpson	Rocky Mountain Fuel Co.	Lafayette	7½ ft.	Shaft	Lignite	97	102.6	81,599
Vulcan	Rocky Mountain Fuel Co.	Lafayette	6 ft.	Shaft	Lignite	196	45.8	51,348
Mitchell	Rocky Mountain Fuel Co.	Lafayette	6 ft.	Shaft	Lignite	210	45.8	46,065
Rex No. 1.	Rocky Mountain Fuel Co.	Louisville	6½ ft.	Shaft	Lignite	168.5	79.8	85,693
Rex No. 2.	Rocky Mountain Fuel Co.	Louisville	5 ft.	Shaft	Lignite	239	20.6	15,826
Itecla	Rocky Mountain Fuel Co.	Louisville	5 ft.	Shaft	Lignite	173	73.5	49,411
Acme	Rocky Mountain Fuel Co.	Louisville	5½ to 7½ ft.	Shaft	Lignite	28	4	579
Gorham	Rocky Mountain Fuel Co.	Gorham	6 ft.	Slope	Lignite	251	108	81,047
Industrial	Rocky Mountain Fuel Co.	Superior	6 ft.	Shaft	Lignite	219	96.4	74,851
Monarch No. 1.	National Fuel Co.	Downer	3½ to 7 ft.	Shaft	Lignite	238	108.9	77,582
Monarch No. 2.	National Fuel Co.	Broomfield	4½ to 9 ft.	Shaft	Lignite	185	57.1	46,821
Capitol	American Fuel Co.	Lafayette	6 ft.	Shaft	Lignite	185.9	101.5	69,843
Fox	American Fuel Co.	Gorham	8 ft.	Shaft	Lignite	158	77.4	59,005
Matchless	American Fuel Co.	Louisville	4 to 6 ft.	Shaft	Lignite	194	86.3	48,500

TABLE 33—Continued

BOULDER COUNTY

Name of Mine	Name of Operator	Post-Office Address or Location of Mine	Thickness of Coal-Bed Under Operation	Kind of Opening	Character of Coal	No. of Days Worked	Average No. of Men Employed	Total Produc- tion, (Tons of 2,000 lbs.)
Centennial	American Fuel Co.	Louisville	6 ft.	Shaft	Lignite	200.5	84.4	47,121
Senator	American Fuel Co.	Lafayette	7½ ft.	Shaft	Lignite	126	44	15,265
Nonparell	Brooks-Harrison Fuel Co.	Louisville	9 to 10 ft.	Shaft	Lignite	280	27	30,677
Strathmore	Strathmore Fuel Co.	Layette	6 to 10 ft.	Shaft	Lignite	204.5	31.3	23,666
Summit	Russell Gates Mining Co.	Layette	.5 to 9 ft.	Shaft	Lignite	210	27.5	22,509
Sunnyside	Bix Six Coal Co.	Louisville	.5 ft.	Shaft	Lignite	176.5	34	19,272
Total number of mines in operation.....							189.2	1,365
								1,053,001

Total number of mines in operation..... 21

TABLE 36

FREMONT COUNTY

Name of Mine	Name of Operator	Post-Office Address or Location of Mine	Thickness of Coal-Bed Under Operation	Kind of Opening	Character of Coal	No. of Days Worked	Average No. of Men Employed	Total Production, (Tons of 2,000 lbs.)
Rockvale	Colorado Fuel & Iron Co.....	Rockvale	3½ to 4 ft.	Shaft	Semi-bituminous	201	452.2	221,014
Coal Creek	Colorado Fuel & Iron Co.....	Coal Creek.....	3 to 3½ ft.	Slope	Semi-bituminous	234	236.1	121,657
Fremont	Colorado Fuel & Iron Co.....	Fremont	5 to 5½ ft.	Shaft	Semi-bituminous	154	269.5	118,053
Chandler	Victor-American Fuel Co.....	Chandler	4½ to 5 ft.	Shaft	Semi-bituminous	296.4	176.5	114,467
Radiant	Victor-American Fuel Co.....	Radiant	3 ft. 10 in.	Slope	Semi-bituminous	219	77.4	41,980
Magnet	Rocky Mountain Fuel Co.....	Williamsburg	4½ ft.	Slope	Semi-bituminous	196.2	95.5	41,465
Royal Gorge	E. G. Bettis.....	Canon City.....	3½ ft.	Slope	Semi-bituminous	261	58.3	34,803
Emerald	Williamsburg Slope Coal Co.....	Williamsburg.....	2½ to 3¼ ft.	Slope	Semi-bituminous	166	60.5	20,174
Colorado Central.....	Colorado Central Coal & Mining Co.....	Canon City.....	5 ft.	Shaft	Semi-bituminous	163	28.3	7,191
Williamsburg Slope.....	Donnelly Coal Co.....	Florence	3¾ ft.	Slope	Semi-bituminous	214	9	5,020
Brookside	Brookside Coal Co.....	Canon City.....	3½ ft.	Slope	Semi-bituminous	187.5	10.8	4,222
Willie	Samuel Petry	Florence	3 ft.	Slope	Semi-bituminous	199	6	3,142
Total number of mines in operation.....						200	1,480.1	733,188

TABLE 38

GUNNISON COUNTY

Name of Mine	Name of Operator	Post-Office Address or Location of Mine	Thickness of Coal-Bed Under Operation	Kind of Opening	Character of Coal	No. of Days Worked	Average No. of Men Employed	Total Produc- tion, (Tons of 2,000 lbs.)
Somerset	Utah Fuel Co.	Somerset	25 ft.	Slope	Bituminous	246.2	212	266,504
Crested Butte	Colorado Fuel & Iron Co.	Crested Butte	5 to 25 ft.	Drift	Bituminous	178.8	193.5	116,788
Floresta	Colorado Fuel & Iron Co.	Crested Butte	3 to 3½ ft.	Slope	Anthracite	172.2	157.8	55,041
Porter	Littell Coal & Mining Co.	Crested Butte	15 and 8 ft.	Drift	Bituminous	236	53.5	45,026
Horace	Pueblo Fuel & Mining Co.	Crested Butte	3¾ ft.	Slope	Anthracite	231	30.5	13,996
Bulkley	Crested Butte Coal Co.	Crested Butte	7 ft.	Slope	Bituminous	227.6	27.3	35,218
Kubler	Rocky Mountain Fuel Co.	Baldwin	5½ ft.	Drift	Semi-bituminous	139.6	37.9	22,023
Baldwin Star	Baldwin Fuel Co.	Gunnison	.....	Drift	Bituminous	168.5	7	4,531
Total number of mines in operation.....							719	559,427

TABLE 39

HUERFANO COUNTY

Name of Mine	Name of Operator	Post-Office Address or Location of Mine	Thickness of Coal-Bed Under Operation	Kind of (Opening	Character of Coal	No. of Days Worked	Average No. of Men Employed	Total Production, (Tons of 2,000 lbs.)
Robinson	Colorado Fuel & Iron Co.	Walsen	4½ to 6 ft.	Slope	Bituminous	283.5	352	280,716
Rouse	Colorado Fuel & Iron Co.	Rouse	6 to 7 ft.	Slope	Bituminous	216.6	233.5	216,784
Pictou	Colorado Fuel & Iron Co.	Pictou	3½ to 10 ft.	Slope	Bituminous	242.8	200.6	135,289
Ideal	Colorado Fuel & Iron Co.	Ideal	3 to 4 ft.	Slope	Bituminous	224.9	119.1	97,561
Lester	Colorado Fuel & Iron Co.	Lester	5 to 8 ft.	Slope	Bituminous	100.6	189.2	69,491
Cameron	Colorado Fuel & Iron Co.	Farr	2½ to 5 ft.	Slope	Bituminous	275.3	65.9	53,253
Walsen	Colorado Fuel & Iron Co.	Walsen	5 to 6 ft.	Slope	Bituminous	51	97.6	15,632
Ravenwood	Victor-American Fuel Co.	Ravenwood	2½ to 3 ft.	Slope	Bituminous	292	148.6	99,589
Maitland	Victor-American Fuel Co.	Maitland	4½ ft.	Slope	Bituminous	263	103.8	64,416
Oakdale	Oakdale Coal Co.	Oakview	14 ft.	Slope	Bituminous	241.5	202.7	222,361
Pryor	Union Coal & Coke Co.	Pryor	4, 6 to 7 ft.	Slope	Bituminous	174.5	102.2	100,440
Huerfano	Huerfano Coal Co.	Walsenburg	4½ ft.	Shaft	Bituminous	239	92.4	64,060
Big Four	Big Four Coal Co.	Tioga	7 to 8 ft.	Slope	Bituminous	154	47.9	55,826
Toltec	Fruith & Autrey	Walsenburg	3½ ft.	Slope	Bituminous	239.5	73.9	52,003
Sunnyside	Sunnyside Coal Mining Co.	Strong	7 ft.	Slope	Bituminous	149.8	70.5	50,119

Pinon.....	Rocky Mountain Fuel Co.....	McGuire	5 ft.	Shaft	Bituminous	180.3	68.2	51,110
Rugby	Rugby Fuel Co.....	Rugby	4 ft.	Slope	Bituminous	249.9	56.2	48,973
Tioga	Minnequa Coal Co.....	Tioga	5½ ft.	Slope	Bituminous	174.1	49.7	44,719
Gordon	Gordon Coal Co.....	Walsenburg	5½ ft.	Slope	Bituminous	170	43.9	25,507
Breen	Green Coal Mining Co.....	Walsenburg	6 ft.	Slope	Bituminous	181	26.8	23,133
Reliance	Alliance Coal Co.....	Oakview	6 to 11 ft.	Slope	Bituminous	261	33.5	20,867
Round Oak	Alliance Coal Co.....	Ravenwood..	3 ft. 2 in. & 4½ ft.	Slope	Bituminous	75.5	29.7	9,800
Rockland	Walsenburg Fuel Co.....	Walsenburg	6 ft.	Shaft	Bituminous	319.2	40.5	22,780
Caddell	Black Canon Fuel Co.....	Walsenburg	4½ ft.	Slope	Bituminous	225.8	24.4	18,778
Black Canon	New Maitland Coal Co.....	Walsenburg	3 2-3 ft.	Slope	Bituminous	194.5	21.6	15,889
Loma	Loma Fuel Co.....	Walsenburg	2 ft. 2 in.	Slope	Bituminous	223	16.6	13,465
Bunker Hill	Bunker Hill Coal Co.....	Rouse	5 ft.	Drift	Bituminous	50	29	4,750
				Shaft and				
Carbonado	Carbonado Coal Mining Co.....	Walsenburg .....	.....	Drift	Bituminous	115	22.4	4,710
Turner	Robert Turner	Strong	8 ft.	Slope	Bituminous	22	35	3,000
Larmore	Beacon Mining Co.....	Strong	8 ft.	Slope	Bituminous	32	24.6	2,876
La Veta	La Veta Coal Co.....	Oakview .....	.....	.....	Bituminous	45	5	1,400
Total number of mines in operation.....						183.1	2,627	1,889,700

31

TABLE 40

JACKSON COUNTY

Name of Mine	Name of Operator	Post-Office Address or Location of Mine	Thickness of Coal-Bed Under Operation	Kind of Opening	Character of Coal	No. of Days Worked	Average No. of Men Employed	Total Produc- tion, (Tons of 2,000 lbs.)
Coalmont	Northern Colorado Coal Co.	Coalmont	65 ft.	Slope	Semi-bituminous	142	53.2	38,739
Total number of mines in operation..... 1								
						142	53.2	38,739

TABLE 41

JEFFERSON COUNTY

Name of Mine	Name of Operator	Post-Office Address or Location of Mine	Thickness of Coal-Bed Under Operation	Kind of Opening	Character of Coal	No. of Days Worked	Average No. of Men Employed	Total Produc- tion, (Tons of 2,000 lbs.)
Leyden No. 2	Leyden Coal Co.	Leyden	9 ft.	Shaft	Lignite	147	187.7	70,333
Leyden No. 3	Leyden Coal Co.	Leyden	7 ft.	Shaft	Lignite	127	26.6	12,003
White Ash	Rooney White Ash Coal Co.	Morrison	11 ft.	Shaft	Lignite	300	6.3	1,106
Total number of mines in operation..... 3								
						191.3	220.6	83,442

TABLE 42

LAS ANIMAS COUNTY

Name of Mine	Name of Operator	Post-Office Address or Location of Mine	Thickness of Coal-Bed Under Operation	Kind of Opening	Character of Coal	No. of Days Worked	Average No. of Men Employed	Total Produc- tion, (Tons of 2,000 lbs.)
Berwind	Colorado Fuel & Iron Co.....	Berwind	4½ to 6½ ft.	Drift	Bituminous	301	471.5	362,939
Frederick	Colorado Fuel & Iron Co.....	Valdez	5 to 9 ft.	Drift	Bituminous	276.1	377.6	382,727
Primero	Colorado Fuel & Iron Co.....	Primero	6 to 9 ft	Drift	Bituminous	159.8	333	323,456
Starkville	Colorado Fuel & Iron Co.....	Starkville	6 to 7 ft.	Drift	Bituminous	252	335.9	237,980
Sopris	Colorado Fuel & Iron Co.....	Sopris	3½ to 4½ ft	Drift	Bituminous	301	239.5	182,627
				Slope and				
Morley	Colorado Fuel & Iron Co.....	Morley	4½ to 8 ft.	Drift	Bituminous	248.9	271.6	176,822
Tabasco	Colorado Fuel & Iron Co.....	Tabasco	6 to 8 ft.	Slope	Bituminous	296	141.2	149,780
Tercio	Colorado Fuel & Iron Co.....	Tercio	4 to 6 ft.	Drift	Bituminous	281	152	124,411
Delagua	Victor-American Fuel Co.....	Delagua	5 to 7 ft.	Slope	Bituminous	284.1	681.7	625,958
Hastings	Victor-American Fuel Co.....	Hastings	4 to 9 ft.	Slope	Bituminous	300	197.3	231,468
Bowen	Victor-American Fuel Co.....	Bowen	5 to 6 ft.	Drift	Bituminous	263	190	233,480
Gray Creek	Victor-American Fuel Co.....	Gray Creek.....	3 to 5 ft.	Drift	Bituminous	284	145.3	115,519
				Slope and				
Cokedale	Carbon Coal & Coke Co.....	Cokedale	6 ft.	Drift	Bituminous	304	202.6	257,496

TABLE 42—Concluded

LAS ANIMAS COUNTY

Name of Mine	Name of Operator	Post-Office Address or Location of Mine	Thickness of Coal-Bed Under Operation	Kind of Opening	Character of Coal	No. of Days Worked	Average No. of Men Employed	Total Produc- tion, (Tons of 2,000 lbs.)
Piedmont	Rocky Mountain Fuel Co.	Piedmont	3½ to 7 ft.	Slope	Bituminous	280	183.7	188,837
Forbes	Rocky Mountain Fuel Co.	Forbes	4 ft.	Drift	Bituminous	245	155.8	130,467
Majestic	Rocky Mountain Fuel Co.	Majestic	4½ to 9 ft.	Drift	Bituminous	289.5	77.5	87,460
Toller	Cedar Hill Coal & Coke Co.	Tollerburg	5 to 6 ft.	Shaft	Bituminous	270	137.8	156,537
Greenville	Cedar Hill Coal & Coke Co.	Ludlow	5 to 6 ft.	Slope	Bituminous	224	56.5	59,079
Black Diamond	Cedar Hill Coal & Coke Co.	Cedarhurst	3 ft. 8 in.	Slope	Bituminous	84	40.7	10,378
Beacon	National Fuel Co.	Beacon	3 ft. 8 in. to 4 ft. 8 in.	Slope	Bituminous	280.5	107.8	69,021
Thor	National Fuel Co.	Bowen	5 to 6 ft.	Drift	Bituminous	188	69.4	60,746
Wootton	Wootton Land & Fuel Co.	Wootton	5 ft.	Drift	Bituminous	280	161.3	138,606
Ludlow	Huerfano Coal Co.	Ludlow	4 to 5 ft.	Drift	Bituminous	198.5	106.7	61,432
Empire	Empire Coal Mining Co.	Aguilar	5 to 7 ft.	Slope	Bituminous	309.5	45.5	54,649
Brodhead No. 9	Southern Colorado Coal Co.	Brodhead	4 to 4½ ft.	Slope	Bituminous	275	80.8	51,970
Primrose	Primrose Coal Co.	Rugby	3 ft. 4 in.	Slope	Bituminous	268.4	85.7	48,004
McLaughlin	McLaughlin Bros.' Coal Co.	Trinidad	5½ to 6 ft.	Slope	Bituminous	284.5	71.2	45,365
Kenneth	Chicosa Fuel Co.	Tabasco	4 ft.	Drift	Bituminous	205.5	45	52,163

Royal	Royal Fuel Co.....	Agullar	6½ ft.	Shaft	Bituminous	285	41	35,050
Southwestern	Southwestern Fuel Co.....	Agullar	4 to 5 ft.	Slope	Bituminous	208	63	32,836
Rapson No. 1.....	Rapson Coal Mining Co.....	Rugby	¾ to 4 ft.	Slope	Bituminous	193	38	22,364
Jewel	Ideal Fuel Co.....	Agullar	¾ ft.	Slope	Bituminous	148.8	36.8	15,586
Bloom	Jeffries Coal Mining Co.....	Trinidad	5 ft.	Drift	Bituminous	306	14.7	16,243
Viola	Johnston Coal & Coke Co.....	Trinidad	3 ft.	Drift	Bituminous	136	32.6	12,230
Alta	Alta Fuel Co.....	Brothead	4 ft. 7 in.	Drift	Bituminous	178	12.4	6,895
Baldy	Baldy Coal Co.....	Trinidad	5 to 7 ft.	Slope	Bituminous	241	7.6	5,499
Amador	Amador Fuel Co.....	Agullar .....	.....	.....	Bituminous	186	5	2,852
Star	Star Coal Mining Co.....	Cedarhurst	2 ft. 3 in.	Drift	Bituminous	25	15	1,400
Total number of mines in operation.....					241.6	5,490.7	4,770,292	

TABLE 43

LA PLATA COUNTY

Name of Mine	Name of Operator	Post-Office Address or Location of Mine	Thickness of Coal-Bed Under Operation	Kind of Openings	Character of Coal	No. of Days Worked	Average No. of Men Employed	Total Produc- tion. (Tons of 2,000 lbs.)
Perlin's Peak	Calumet Fuel Co.	Durango	5 ft.	Drift	Bituminous	206.9	72.1	62,309
Hesperus	Porter Fuel Co.	Durango	5 ft.	Drift	Semi-bituminous	139.2	37.9	25,066
				Slope and				
San Juan	Carbon Coal & Coke Co.	Durango	5 ft.	Drift	Bituminous	279	22.2	21,032
City	Royal Coal & Coke Co.	Durango	2½ ft.	Tunnel	Bituminous	278	21	12,704
Total number of mines in operation.....						226.7	153.2	121,111

TABLE 45

PITKIN COUNTY

Name of Mine	Name of Operator	Post-Office Address or Location of Mine	Thickness of Coal-Bed Under Operation	Kind of Opening	Character of Coal	No. of Days Worked	Average No. of Men Employed	Total Produc- tion (Tons of 2,000 lbs.)
Spring Gulch	Colorado Fuel & Iron Co.	Spring Gulch	5½ to 10 ft.	Slope	Bituminous	177.5	84.5	74,182
Total number of mines in operation..... 1								
						177.5	84.5	74,182

TABLE 46

ROUTT COUNTY

Name of Mine	Name of Operator	Post-Office Address or Location of Mine	Thickness of Coal-Bed Under Operation	Kind of Opening	Character of Coal	No. of Days Worked	Average No. of Men Employed	Total Produc- tion (Tons of 2,000 lbs.)
Oak Hills No. 1.....	Moffat Coal Co.....	Oak Hills	7 to 10 ft.	Slope	Bituminous	219.5	151.5	145,586
				Slope and				
Oak Hills No. 2.....	Moffat Coal Co.....	Oak Hills	12 ft.	Drift	Bituminous	175.5	61.3	46,146
Pinnacle	Route County Fuel Co.....	Oak Creek	16 ft.	Drift	Bituminous	189	78.1	109,549
Yampa Valley No. 1..	Yampa Valley Coal Co.....	Oak Creek.....	12 to 14 ft.	Drift	Bituminous	179.8	81.5	75,689
Yampa Valley No. 2..	Yampa Valley Coal Co.....	Oak Creek.....	12 to 14 ft.	Drift	Bituminous	72.6	7.6	4,926
Juniper	Juniper Coal Co.....	Oak Creek.....	4 to 11 ft.	Slope	Bituminous	170	67.1	59,066
Total number of mines in operation.....								447.1
								441,002

TABLE 47

WELD COUNTY

Name of Mine	Name of Operator	Post-Office Address or Location of Mine	Thickness of Coal-Bed Under Operation	Kind of Opening	Character of Coal	No. of Days Worked	Average No. of Men Employed	Total Production (Tons of 2,000 lbs.)
Puritan	National Fuel Co.	Erie	8 ft.	Shaft	Lignite	207	92.9	125,535
Parkdale	National Fuel Co.	Lafayette	6 to 10 ft.	Slope	Lignite	276	73.7	83,276
Golden Ash	Consolidated Coal & Coke Co.	Dacona	7½ to 9 ft.	Shaft	Lignite	216	181	141,323
Frederick	Frederick Coal	Frederick	8½ ft.	Slope	Lignite	178.9	51.5	47,999
Evans	American Fuel Co.	Frederick	8 ft.	Shaft	Lignite	195	72.7	34,690
Ideal	Ideal Coal Co.	Erie	8 ft.	Slope	Lignite	298	14.9	14,107
Shamrock	Shamrock Coal Co.	Erie	11 ft.	Shaft	Lignite	277	12.6	10,346
Firestone	Louisville Coal & Land Co.	Firestone	6½ ft.	Shaft	Lignite	133.4	43.8	19,355
Alpha	Alpha Coal Co.	Fort Lupton	6 ft.	Shaft	Lignite	314	19.1	5,409
Andrew	State Coal Co.	Erie	11 ft.	Shaft	Lignite	95.5	22.6	5,694
Warwick	Rocky Mountain Fuel Co.	Frederick	4 to 5 ft.	Shaft	Lignite	42	19	1,645
Total number of mines in operation.....							603.8	489,379

TABLE 48

COKE PRODUCTION, 1912, BY COMPANIES AND COUNTIES

Companies	Total		Counties	Total	
	No. of Ovens	Tonnage		No. of Ovens	Tonnage
Colorado Fuel & Iron Co.....	1,338	756,831	Gunnison	52	19,612
Carbon Coal & Coke Co.....	240	160,720	Las Animas	1,678	945,985
Victor-American Fuel Co.....	92	48,046	La Plata	21	6,942
American Smelting & Refining Co..	21	6,942	.....	.....	.....
Totals	1,751	972,539	.....	1,751	972,539

TABLE 49

SUMMARY OF COAL PRODUCTION OF COLORADO FROM 1873 TO 1912

Year	Tons	Year	Tons
1873.....	69,977	1893.....	3,947,056
1874.....	87,372	1894.....	3,021,028
1875.....	98,838	1895.....	3,339,495
1876.....	117,666	1896.....	3,371,633
1877.....	160,000	1897.....	3,565,660
1878.....	200,630	1898.....	4,174,037
1879.....	322,732	1899.....	4,826,939
1880.....	375,000	1900.....	5,495,734
1881.....	706,744	1901.....	6,210,406
1882.....	1,161,479	1902.....	7,522,923
1883.....	1,220,593	1903.....	7,775,302
1884.....	1,130,024	1904.....	6,776,551
1885.....	1,398,796	1905.....	8,989,631
1886.....	1,436,211	1906.....	10,308,421
1887.....	1,791,735	1907.....	10,965,640
1888.....	2,185,477	1908.....	9,773,007
1889.....	2,400,629	1909.....	10,772,490
1890.....	3,075,781	1910.....	12,134,887
1891.....	3,512,632	1911.....	10,197,595
1892.....	3,771,234	1912.....	11,016,948

TABLE 50

NUMBER OF TONS OF COAL PRODUCED IN COAL MINES OF THE
UNITED STATES, 1814 TO 1908, AND OF CANADA, 1874 TO 1908

Year	United States	Canada	Total
1870	33,035,580	.....	33,035,580
1871	46,885,080	.....	46,885,080
1872	51,453,399	.....	51,453,399
1873	57,602,480	.....	57,602,480
1874	52,605,920	1,063,742	53,669,662
1875	52,348,320	1,039,974	53,388,294
1876	53,280,000	994,762	54,274,762
1877	60,501,760	1,036,670	61,538,430
1878	57,935,600	1,089,744	59,025,344
1879	68,105,799	1,126,497	69,232,296
Total	533,753,938	6,351,389	540,105,327
1880	71,481,570	1,482,714	72,964,284
1881	85,881,030	1,537,106	87,418,136
1882	103,551,189	1,848,148	105,399,337
1883	115,707,525	1,818,684	117,526,209
1884	120,155,551	1,984,959	122,140,510
1885	111,160,295	1,920,977	113,081,272
1886	113,680,427	2,116,653	115,797,080
1887	130,650,511	2,429,330	133,079,841
1888	148,659,657	2,602,552	151,262,209
1889	141,229,513	2,658,303	143,887,816
Total	1,142,157,268	20,399,426	1,162,556,694
1890	157,770,963	3,084,682	160,855,645
1891	168,566,669	3,577,749	172,144,418
1892	179,329,071	3,287,745	182,616,816
1893	182,352,774	3,783,499	186,136,273
1894	170,741,526	3,847,070	174,588,596
1895	193,117,530	3,478,314	196,595,844
1896	191,986,357	3,745,716	195,732,073
1897	200,229,199	3,786,107	204,015,306
1898	219,976,267	4,173,103	224,149,370
1899	253,741,192	4,925,051	258,666,243
Total	1,917,811,548	37,689,041	1,955,500,589

TABLE 50—Concluded

NUMBER OF TONS OF COAL PRODUCED IN COAL MINES OF THE
UNITED STATES, 1814 TO 1908, AND OF CANADA, 1874 TO 1908

Year	United States	Canada	Total
1900	269,684,027	5,777,319	275,461,346
1901	293,299,816	6,486,325	299,786,141
1902	301,590,439	7,466,681	309,057,120
1903	357,356,416	7,960,364	365,316,780
1904	351,816,398	8,254,595	360,070,993
1905	392,722,635	8,667,948	401,390,583
1906	414,157,278	9,762,601	423,919,879
1907	480,363,424	10,511,426	490,874,850
1908	415,842,698	10,904,486	426,747,184
Total	3,276,833,131	75,791,745	3,352,624,876
Grand total.....	7,280,940,265	140,231,601	7,421,171,866

READINGS TAKEN AT CRESTED BUTTE MINE

GUNNISON COUNTY DECEMBER 11, 1912

By Frank N. Oberding, Deputy State Coal Mine Inspector

Dry	Wet	Relative	
Bulb	Bulb	Humidity	Where Taken
30	30	100	Inside radiator near parting
36	34	84	Rock tunnel
50	44	64	2nd S. above main, near face
59	54	74	5th S., 3rd incline
59	59	100	Main return

READINGS TAKEN IN TERCIO MINE

LAS ANIMAS COUNTY DECEMBER 13, 1912

By Henry King, Deputy State Coal Mine Inspector

Dry	Wet	Relative	
Bulb	Bulb	Humidity	Where Taken
41	32	38	Outside of mine
57	55	88	150 ft. from radiator
54	53	94	3,000 ft. from mouth of drift
57	56	94	4,900 ft. from mouth of drift
61	60.5	97	7,100 ft. from mouth of drift
60	59.5	97	100 ft. from face of entry A seam, No. 2 mine
60	59.5	97	Junction A and C seams, No. 2 mine
60	60	100	Near face of entry C seam, No. 2 mine

READINGS TAKEN AT STARKVILLE MINE

LAS ANIMAS COUNTY DECEMBER 11, 1912

By Henry King, Deputy State Coal Mine Inspector

Dry	Wet	Relative	
Bulb	Bulb	Humidity	Where Taken
48	43	62	Opposite 1st S. parting
56	50	68	4th S. entry
70	66	82	8th S., Junction J-9 entry
75	70	78	12th S., Junction J-9 entry
76	74	91	Room 73, near face J-6 entry
75	74.5	98	8th S. motor road, near J-6 entry
75	74.5	98	Bottom H-1 entry
77	76	96	Top of H-1 entry

Outside temperature 20°; no reading taken.

These readings are very unsatisfactory for Starkville mine, but the radiator was broken for a week—one side only used.

READINGS TAKEN IN MORLEY SLOPE

LAS ANIMAS COUNTY DECEMBER 9, 1912

By Henry King, Deputy State Coal Mine Inspector

Dry	Wet	Relative	
Bulb	Bulb	Humidity	Where Taken
32	29	67	Outside of mine
50	49.5	97	2nd S. on slope, 600 ft. from surface
52	51.5	97	Junction 5th left on slope
59	53	95	175 ft. from face of 5th left
57	56	94	Inside cross-cut 1 and 2 plane 5th S.
59	58	95	Inside cross-cut 5th right entry
56	55	94	Inside cross-cut 1 and 2 plane off 5th right
59	58.5	97	Inside cross-cut 4th right entry
59.5	59	97	Inside cross-cut 3 and 4 plane off 4th right

EAST MORLEY MINE DECEMBER 10, 1912

Dry	Wet	Relative	
Bulb	Bulb	Humidity	Where Taken
44	35	42	Outside of mine, in the sun
63.5	63.5	100	Near mouth of drift in return air
66	65.5	98	3rd N. junction with main haulage road
57	57	100	2,700 ft. from radiator, intake airway
65	64	95	5,300 ft. from surface on main drift
68.5	68	98	Junction 2nd E. and 6th N.

FREDERICK MINE DECEMBER 12, 1912

Dry	Wet	Relative	
Bulb	Bulb	Humidity	Where Taken
45	32	20	Inside radiator on main intake
52	50	89	Junction 1st E and main haulage road
56.5	55	92	Junction 3rd E. and main haulage road
63	62	95	Junction 9th W. and main haulage road
64.5	64	97	Room 24, 11th E. entry
67	66.5	98	Room 18, 11th W. entry
64.5	64.5	100	300 ft. in 14th E. entry, main haulage road
63.5	63	97	4th E. return opposite 3rd E. parting
63.5	63.5	100	Main return airway, near 2nd W. entry

Outside temperature 20°; no reading taken.

READINGS TAKEN IN TABASCO MINE

LAS ANIMAS COUNTY DECEMBER 21, 1912

By Henry King, Deputy State Coal Mine Inspector

Dry	Wet	Relative	
Bulb	Bulb	Humidity	Where Taken
56	56	100	1st S. entry and return airway
43.5	42.5	93	85 ft. from face of slope and 2,600 ft. from mouth of slope
59	58.5	97	2nd S. entry, bottom 3rd and 4th plain
59.5	59	97	1st plane, 2nd S., 1st room
57.5	57	97	1st plane, 1st S., 10th room

Outside temperature, 21°.

There is no radiator in this mine, but the mine is very wet near the slope, and ice was on the timber 1,200 feet from the mouth of the slope. Note the second reading: the low temperature and the high relative humidity, caused by the very wet zone. The air had to travel through all the workings in humid condition.

SOPRIS MINE DECEMBER 19, 1912

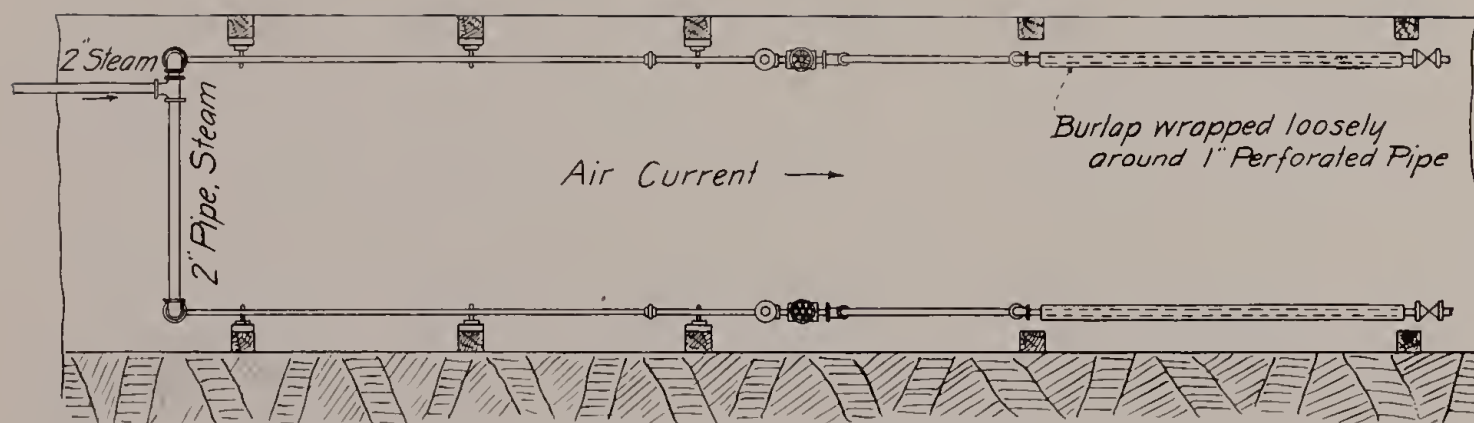
Dry	Wet	Relative	
Bulb	Bulb	Humidity	Where Taken
64.5	64.5	100	Revolving door on return airway
64	64	100	300 ft. inside radiator intake airway
60.5	58.5	90	Opposite 15th E. parting intake airway
64.5	63	93	Return from 18th W. junction back slope and 20th W.
66	66	100	150 ft. from face of 19th E. entry
62.5	61.5	95	Intake airway 18th E., opposite 17th E. parting
64	64	100	16th E. entry, Room 92
64	64	100	17th E. entry, Room 92

Temperature one foot from roof at inside end of radiator, 72°.

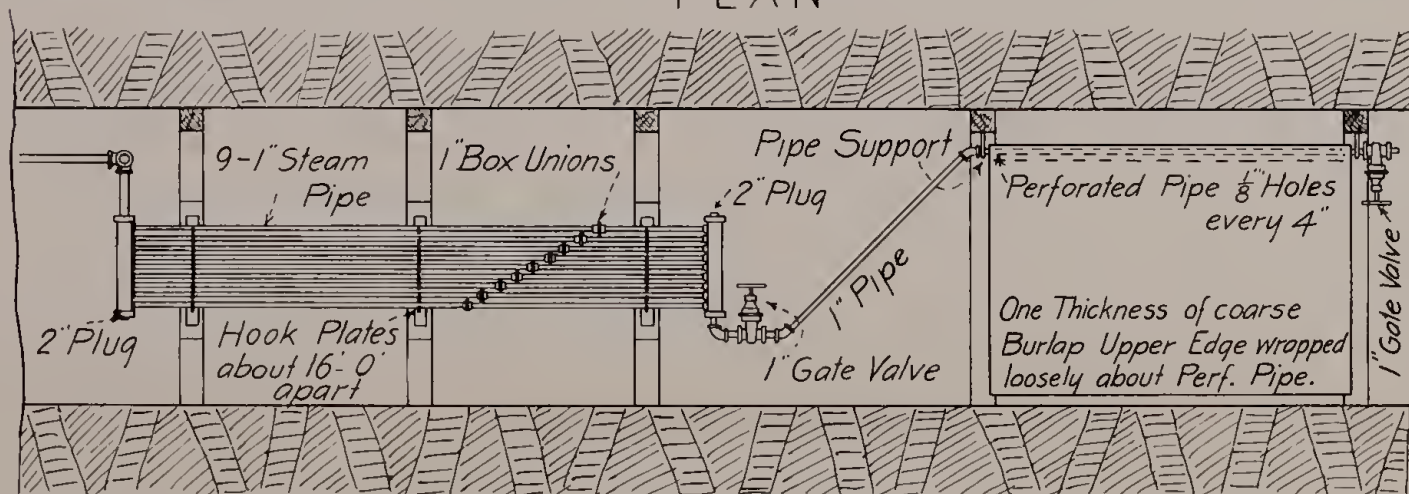
Temperature one foot from bottom at inside end of radiator, 59°.

Outside temperature, 30°.

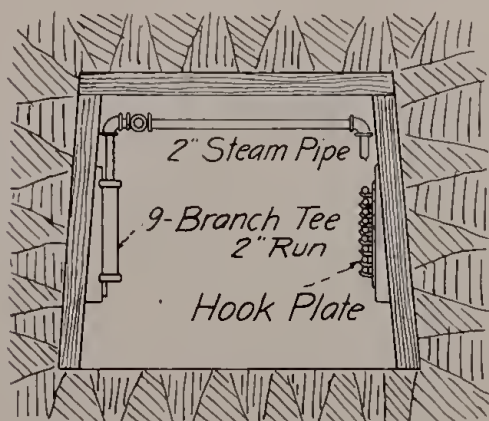
I consider these readings very good; same as two years ago.



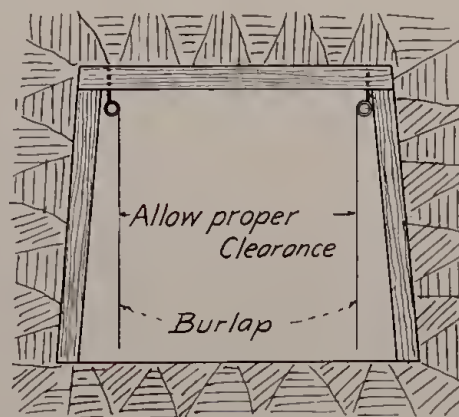
PLAN



ELEVATION



FRONT VIEW



REAR VIEW



DETAIL OF ONE INCH PERFORATED PIPE

ILLUSTRATION NO. 3

Radiator Installed by the C. F. & I. at Their Coking Coal Mines in Las Animas County in 1911.

READINGS TAKEN IN FIRST NORTH AND FIRST EAST, PRIMERO MINE

LAS ANIMAS COUNTY DECEMBER 18, 1912

By Henry King, Deputy State Coal Mine Inspector

FIRST NORTH PRIMERO MINE

Dry	Wet	Relative	
Bulb	Bulb	Humidity	Where Taken
46	42	74	200 ft. from mouth of drift inside radiator
50	47	82	2,500 ft. from mouth of drift
53	50	83	4,200 ft. from mouth of drift
57	54	84	5,000 ft. from mouth of drift B-9 entry
60	58	90	Room 2 on A-12 entry
66	65	95	Room 1 of 4th blind cross-cut A-12
62.5	61.5	95	Room 4, A-11
61	61	100	300 ft. from fan return airway

FIRST EAST PRIMERO MINE

Dry	Wet	Relative	
Bulb	Bulb	Humidity	Where Taken
44.5	31	16	Outside of mine
58	46	27	150 ft. inside radiator
50.5	48	85	Junction B-8 E. on main haulage road
62.5	61.5	95	140 ft. from face of main road
56	53.5	86	B-9 W. entry, near face
66.5	64.5	90	75 ft. from face B-9 E. entry
66.5	66	98	Return airway 100 ft. below overcast

BERWIND MINE NO. 3, DECEMBER 20, 1912

Dry	Wet	Relative	
Bulb	Bulb	Humidity	Where Taken
50.5	49.5	94	Junction 12 W. and main intake air-course
60	57	85	Junction 14 W. and back slope
70.5	70	98	300 ft. from bottom of slope
72.5	72	98	Junction 18 E. and main S. entry
69	68.5	98	Junction 2nd S. motor road and return air-course
71.5	71.5	100	Junction 2nd S. and 18th E. entry
64.5	64	97	Junction 5th S. and 18th E. entry
64	63.5	97	Room 47 off 16th E. entry
65.5	64.5	95	300 ft. from fan on return air-course



Directory of Coal Mines

BOULDER COUNTY

Name of Mine	Name and Address of Operator	Pres. or Gen'l. Mgr.	Local		Mode of Railroad	Remarks
			Pres.	Superintendent	Ventilation Connections	
Standard	Rocky Mountain Fuel Co., Denver.....	E. E. Shumway,	Pres.	D. M. Sultz	Fan C. & S., B. & M., U. P.	.....
Simpson	Rocky Mountain Fuel Co., Denver.....	E. E. Shumway,	Pres.	Henry Denman	Fan C. & S., B. & M., U. P.	.....
Vulcan	Rocky Mountain Fuel Co., Denver.....	E. E. Shumway,	Pres.	Chas. Billington	Fan B. & M., U. P.	.....
Mitchell	Rocky Mountain Fuel Co., Denver.....	E. E. Shumway,	Pres.	Henry Denman	Fan B. & M., U. P.	.....
Rex No. 1.....	Rocky Mountain Fuel Co., Denver.....	E. E. Shumway,	Pres.	J. C. Williams	Fan C. & S.	.....
Rex No. 2.....	Rocky Mountain Fuel Co., Denver.....	E. E. Shumway,	Pres.	Thos. Hilton	Fan C. & S.	.....
Hecla	Rocky Mountain Fuel Co., Denver.....	E. E. Shumway,	Pres.	Ed. Hodgson	Fan C. & S.	.....
Gorham	Rocky Mountain Fuel Co., Denver.....	E. E. Shumway,	Pres.	Geo. Giles	Fan C. & S.	.....
Industrial	Rocky Mountain Fuel Co., Denver.....	E. E. Shumway,	Pres.	F. J. L. MacCormac	Fan C. & S.	.....
Acme	Rocky Mountain Fuel Co., Denver.....	E. E. Shumway,	Pres.	J. C. Williams	Fan C. & S.	.....
Monarch No. 1.....	The National Fuel Co., Denver.....	H. Van Maler		J. F. Robbins	Fan C. & S.	.....
Monarch No. 2.....	The National Fuel Co., Denver.....	H. Van Maler		Joseph Cochrane	Fan C. & S.	.....
Capitol	American Fuel Co., Denver.....	D. E. Evans		O. M. Hopkins	Fan B. & M.	.....
Fox	American Fuel Co., Denver.....	D. E. Evans		J. W. Shultz	Fan C. & S.	.....
Matchless	American Fuel Co., Denver.....	D. E. Evans		Thos. Fox	Fan C. & S.	.....
Centennial	American Fuel Co., Denver.....	D. E. Evans		Elmer Ellis	Fan B. & M.	.....
Senator	American Fuel Co., Denver.....	D. E. Evans		Chris Ward	Fan B. & M.	.....
Strathmore	Strathmore Fuel Co., Lafayette.....			E. M. Cannon	Fan C. & S.	.....
Nonpareil	Brooks-Harrison Fuel Co., Louisville..			J. E. Brooks	Fan C. & S.	.....
Summit	Russell Gates Mining Co., Denver.....	Russell Gates		J. J. Boyd	Fan C. & S.	.....
Sunnyside	Big Six Coal Co., Louisville..			F. N. Carveth	Fan C. & S., B. & M.	.....

DELTA COUNTY

Name of Mine	Name and Address of Operator	Pres. or Gen'l. Mgr.	Local Superintendent	Mode of Ventilation	Railroad Connections	Remarks
King	Juanita Coal & Coke Co., Bowle.....	Alexander Bowle	Wallace D. Bowle	Furnace	D. & R. G	.....
Cedaredge	Sur. Creek Co-op. C. Co., Cedaredge...		A. W. Hall	Natural	.....	.....
Black Diamond.....	Farmers' Progressive C. Co., Paonia...		Chas. Cowan, Jr.	Natural	.....	.....
Farmers'	Paonia Coal Co., Paonia.....		H. H. Stull	Natural	.....	.....
Leroux	Leroux Creek Coal Co., Hotchkiss.....		J. M. Compton	Natural	.....	.....
Hotchkiss	Hotchkiss Fuel & Sup. Co., Hotchkiss.		M. W. Bennett	Natural		

EL PASO COUNTY

Name of Mine	Name and Address of Operator	Pres. or Gen'l. Mgr.	Local Superintendent	Mode of Ventilation	Railroad Connections	Remarks
Pike View.....	Pikes Peak Fuel Co., Colo. Springs...		P. L. Dixon	Fan	D. & R. G.	.....
Curtis	Curtis Coal Mining Co., Colo. Spgs....	C. H. Curtis, Pres.	Ralph Wooden	Fan	R. I.	.....
Rapson No. 2.....	Rapson Coal Co., Colorado Springs....	C. H. Curtis	Ralph Wooden	Fan	R. I.	.....
El Paso.....	El Paso C. L. & F. Co., Colo. Spgs...		W. S. Cook	Fan	A., T. & S. F.	.....
Patterson	Alexander Patterson, Colo. Springs...		Geo. Patterson	Fan	None	.....
Danville	Tudor Coal Co., Colorado Springs.....		Jenkin Tudor	Fan	D. & R. G.	.....
Williamsville	Daniels Coal Co., Colorado Springs....		T. E. Daniels		.....	.....

FREMONT COUNTY

Name of Mine	Name and Address of Operators	Pres. or Gen'l. Mgr.	Local Superintendent	Mode of Ventilation	Railroad Connections	Remarks
Rockvale No. 22.....	Colorado Fuel & Iron Co., Pueblo.....	E. H. Weitzel	Henry Johns	Fan S. F.		.....
Coalcreek	Colorado Fuel & Iron Co., Pueblo.....	E. H. Weitzel	Ben Beach	Fan D. & R. G.		.....
Fremont	Colorado Fuel & Iron Co., Pueblo.....	E. H. Weitzel	A. J. Davis.....	Fan D. & R. G.		.....
Magnet	Rocky Mountain Fuel Co., Denver....	E. E. Shumway	Thos. Gibbs	Fan S. F.		.....
Royal Gorge	E. G. Bettis, Canon City.....		P. Westwater	Fan and Naturals, F.		.....
Emerald	W'ms'b'g Slope C. C., W'ms'b'g Slope..		H. J. Smith.....	Furnace S. F.		.....
Chandler	Victor-American Fuel Co., Denver....	W. J. Murray	E. W. Jones.....	Fan S. F.		.....
Radiant	Victor-American Fuel Co., Denver....	W. J. Murray	G. H. Williams.....	Fan S. F.		.....
Central	Colo., Central Coal & M. Co., Pueblo...		I. A. Littell.....	Fan S. F.		.....
Will'msbr'g Slope...	Donnelly Coal Co., Florence.....		Henry Donnelly.	Natural S. F.		.....
Brookside	Brookside Coal Co., Canon City.....		J. Sippis	Natural S. F.		.....
Willie	Samuel Petry, Florence.....		Samuel Petry....	Natural S. F.		.....

GARFIELD COUNTY

Name of Mine	Name and Address of Operators	Pres. or Gen'l. Mgr.	Local Superintendent	Mode of Ventilation	Railroad Connections	Remarks
Midland	Rocky Mountain Fuel Co., Denver.....	E. E. Shumway	J. E. Smith.....	Fan C. M.		.....
Vulcan	Coryell Mine Leasing Co., Denver....		Chas. Meerdrick....	Fan C. M.		.....
South Canon.....	South Canon Coal Co., Denver.....		Jno. Rees	C. M.		.....
Diamond.....	Cardiff Coal, Cardiff.....			C. M.		Closed down

GUNNISON COUNTY

Name of Mine	Name and Address of Operators	Pres. or Gen'l. Mgr.	Local Superintendent	Mode of Ventilation	Railroad Connections	Remarks
Somerset	Utah Fuel Co., Salt Lake City, Utah.....	H. G. Williams	R. M. Magraw.....	Fan D. & R. G.		.....
Crested Butte	Colorado Fuel & Iron Co., Pueblo.....	E. H. Weitzel	John Arnott	Fan D. & R. G.		.....
Floresta	Colorado Fuel & Iron Co., Pueblo.....	E. H. Weitzel	John Arnott	Fan D. & R. G.		.....
Porter	Littell Coal & Mining Co., Pueblo.....	H. L. Littell	C. F. Fridley.....	Fan D. & R. G.		.....
Horace	Pueblo Fuel & Mining Co., Pueblo....		C. F. Fridley.....	Fan D. & R. G.		.....
Bulkeley	Crested Butte Coal Co., Denver.....	Frank Bulkey	O. V. Roberts.....	Fan D. & R. G.		.....
Kubler	Rocky Mountain Fuel Co., Denver.....	E. E. Shumway	Nat. Cole	Fan C. & S.		.....
Alpine.....	Rocky Mountain Fuel Co.....			Fan C. & S.		Closed down
Baldwin Star.....	Baldwin Fuel Co., Gunnison.....		C. A. Partch....	Natural		New

HUERFANO COUNTY

Name of Mine	Name and Address of Operators	Pres. or Gen'l. Mgr.	Local Superintendent	Mode of Ventilation	Railroad Connections	Remarks
Robinson	Colorado Fuel & Iron Co., Pueblo	E. H. Weltzel	R. K. Graham	Fan	D. R. G.	.....
Rouse	Colorado Fuel & Iron Co., Pueblo	E. H. Weltzel	W. G. Deck	Fan	D. R. G.	.....
Pitkin	Colorado Fuel & Iron Co., Pueblo	E. H. Weltzel	W. H. Manley	Fan	D. R. G.	.....
Idol	Colorado Fuel & Iron Co., Pueblo	E. H. Weltzel	W. J. Tyson	Fan	C. & S.	.....
Lester	Colorado Fuel & Iron Co., Pueblo	E. H. Weltzel	W. G. Deck	Fan	D. & R. G.	.....
Cameron	Colorado Fuel & Iron Co., Pueblo	E. H. Weltzel	T. P. Davis	Fan	C. & S. & D. & R. G.	.....
Walsen	Colorado Fuel & Iron Co., Pueblo	E. H. Weltzel	R. K. Graham	Fan	D. & R. G.	.....
Hazron	Colorado Fuel & Iron Co., Denver	.....	.....	.....	.....	Abandoned
Ravenwood	Victor-American Fuel Co., Denver	W. J. Murray	John Neish	Fan	C. & S.	.....
Maitland	Victor-American Fuel Co., Denver	W. J. Murray	John Shaw	Fan	D. & R. G.	.....
Oakdale	Oakdale Coal Co., Denver	John D. Jones	W. L. Morgan	Fan	D. & R. G.	.....
Prior	Union Coal & Coke Co., Denver	J. W. Bowen	Chas. Beuchat	Fan	C. & S. & D. & R. G.	.....
Huerfano	Huerfano Fuel Co., Denver	S. S. Murphy	R. F. Poli	Fan	C. & S.	.....
Big Four	Big Four Coal & Coke Co., Denver	.....	W. B. McFadden	.....	C. & S. & D. & R. G.	.....
Pinon	Rocky Mountain Fuel Co., Denver	E. B. Shumway	James Hare	Fan	C. & S. & D. & R. G.	.....
Toltec	Fruith and Autrey, Toltec	.....	Fruith & Autrey	Fan	C. & S. & D. & R. G.	.....
Rugby	Rugby Fuel Co., Denver	.....	John Dunmire	Fan	C. & S. & D. & R. G.	.....
Sunnyside	Spinnyside Coal Mining Co., Denver	.....	Frank Stevens	Fan	C. & S. & D. & R. G.	.....
Flora	Minnequa Coal Co., Denver	.....	L. H. McGowan	Fan	D. & R. G.	.....
Gordon	Gordon Coal Co., Walsenburg	.....	H. Capp	.....	C. & S. & D. & R. G.	.....

Breen	Breen Coal Mining Co., Walsenburg..	M. Brennan	Furnace	New
Reliance	Alliance Coal Co., Denver.....	John McDowell....	Fan	Abandoned
Round Oak	Alliance Coal Co., Denver.....	C. H. Peet	Fan D. & R. G.	Reopened
Rockland	Walsenburg Fuel Co., Denver.....	Robert Curry	Fan D. & R. G.	.....
Caddell	Black Canon Fuel Co., Denver.....	Sam Dunford...	Furnace D. & R. G.	.....
Black Canon	New Maitland Coal Co., Walsenburg..	Joseph Ball .....	.....	New
Loma	Loma Fuel Co., Walsenburg.....	C. W. Rankin..	Furnace C. & S. & D. & R. G.	.....
Larmore	Colorado Coal Selling Co., Strong.....	J. M. Brennan.	Furnace D. & R. G.	.....
Bunker Hill	Bunker Hill Coal Co., Rouse.....	Richard F. Bell....	Fan	New
Carbonado	Carbonado Coal Mining Co., Denver..	Jno. Deighton.....	.....	Reopened
La Veta	La Veta Coal Co., Oakview.....	Jas. Turner.....	Furnace .....	.....
Turner	James Turner, Strong.....			

JACKSON COUNTY

Name of Mine	Name and Address of Operators	Pres. or Gen'l. Mgr.	Mode of		Remarks
			Local	Railroad	
Coalmont	Northern Colo. C. Co., Laramie, Wyo.	E. R. Miller	Superintendent	Ventilation Connections	.....
			D. B. Cameron..	Natural L. H. P. & P.	.....

JEFFERSON COUNTY

Name of Mine	Name and Address of Operators	Pres. or Gen'l. Mgr.	Mode of		Remarks
			Local	Connections	
			Superintendent	Ventilation	Local
Leyden No. 2.....	Leyden Coal Co., Denver.....	S. M. Perry	Fred Newmeyer....	Fan D. N. W. & P.	Reopened
Leyden No. 3.....	Leyden Coal Co., Denver.....	S. M. Perry	Fred Newmeyer....	Fan D. N. W. & P.	New
White Ash	Rooney White Ash C. Co., Morrison..	D. W. B. House	T. H. Edwards.	Natural Intermountain	.....

LAS ANIMAS COUNTY

Name of Mine	Name and Address of Operators	Pres. or Gen'l. Mgr	Local Superintendent	Mode of Ventilation	Railroad Connections	Remarks
Berwin	Colorado Fuel & Iron Co., Pueblo	E. H. Weitzel	Chas. O'Neil	Fan	C. & S.	
Frederick	Colorado Fuel & Iron Co., Pueblo	E. H. Weitzel		Fan	C. & W.	
Primero	Colorado Fuel & Iron Co., Pueblo	E. H. Weitzel	Jos. Haske	Fan	C. & W.	
Starkville	Colorado Fuel & Iron Co., Pueblo	E. H. Weitzel	Jas. Wilson	Fan	A., T. & S. F.	
Sopris	Colorado Fuel & Iron Co., Pueblo	E. H. Weitzel	Chas. Chambers	Fan	C. & S. & C. W.	
Morley	Colorado Fuel & Iron Co., Pueblo	E. H. Weitzel	J. R. Jenkins	Fan	A., T. & S. F.	
Tabasco	Colorado Fuel & Iron Co., Pueblo	E. H. Weitzel	Chas. O'Neil	Fan	C. & S.	
Tercio	Colorado Fuel & Iron Co., Pueblo	E. H. Weitzel	A. W. Robinson	Fan	C. & W.	
Engle	Colorado Fuel & Iron Co., Pueblo					Closed
Delagua	Victor-American Fuel Co., Denver	W. J. Murray	B. W. Snodgrass	Fan	S. F., D. & R. G., C. & S.	
Hastings	Victor-American Fuel Co., Denver	W. J. Murray	James Cameron	Fan	S. F., D. & R. G., C. & S.	
Bowen	Victor-American Fuel Co., Denver	W. J. Murray	John Wm. Bell	Fan	C. & S.	
Gray Creek	Victor-American Fuel Co., Denver	W. J. Murray	Thos. Jolly	Fan	C. & S.	
Cass	Victor-American Fuel Co., Denver	W. J. Murray				Closed
Cokedale	Carbon Coal & Coke Co., Denver		F. P. Bayles	Fan	C. & S., D. & R. G., S. & F.	
Piedmont	Rocky Mountain Fuel Co., Denver	E. E. Shumway	Wm. Morgan	Fan	C. & S., D. & R. G., S. & F.	
Forbes	Rocky Mountain Fuel Co., Denver	E. E. Shumway	Robt. Nichol	Fan	C. & S.	

Majestic	Rocky Mountain Fuel Co., Denver....	E. E. Shumway	I. D. Zook.....	Fan	C. & S.	.....
Toller	Cedar Hill Coal & Coke Co., Denver..	D. M. Harrington	H. F. Tennant.....	Fan	C. & S., D. & R. G.	.....
Greenville	Cedar Hill Coal & Coke Co., Denver..	D. M. Harrington	H. F. Tennant.....	Fan	C. & S., D. & R. G.	.....
Black Diamond	Cedar Hill Coal & Coke Co., Denver..	D. M. Harrington	M. J. McKeown. Natural	C. & S., D. & R. G.	.....	.....
Beacon	National Fuel Co., Denver.....	H. Van Mater	Thos. Wakely.....	Fan	C. & S., D. & R. G.	.....
Thor	National Fuel Co., Denver.....		Albert Oliver	Fan	C. & S., D. & R. G.	.....
Wooton	Wooton Land & Fuel Co., Wooton....		James Struthers	Fan		.....
			and Furnace	A., T. & S. F.		.....
Ludlow	Huerfano Coal Co., Denver.....		F. McDermott.....	Fan	C. & S.	.....
Empire	Empire Coal Co., Denver.....		Wm Waddell.....	Fan	C. & S., D. & R. G.	.....
Brodhead No. 9.	So. Colorado Coal Co., Brodhead....		W. M. Burt.....	Fan	C. & S.	Reopened
Primrose	Primrose Coal Co., Rugby.....		H. Mallet.....	Fan	C. & S.	.....
McLaughlin	McLaughlin Bros' C. Co., Starkville..		J. E. McLaughlin....	Fan		.....
			and Natural	.....		.....
Kenneth	Temple Fuel Co., Trinidad.....		G. F. Bowen....	Natural	C. & S.	.....
Royal	Royal Fuel Co., Denver.....	H. Van Mater	James Ewart.....	Fan	Old Brodhead	Reopened
Southwestern	Southwestern Fuel Co., Aguilar.....		Ray Bisch	Fan	C. & S.	.....
			and Furnace	C. & S.		.....
Rapson No. 1.	Rapson C. M. Co., Colorado Springs..		Irving Mellinger....	Fan	C. & S., D. & R. G.	.....
Jewel	Ideal Fuel Co., Aguilar.....		Robt. O'Neil....	Furnace	C. & S.	.....
Bloom	Jeffries Coal & Mining Co., Trinidad..		A. G. Jeffries... Natural	.....		Closed down
Viola	Johnston Coal & Coke Co., Trinidad...					.....
Alta	Alta Fuel Co., Brodhead.....	A. G. Brodhead	John Tittle		C. & S.	.....
Baldy	Baldy Coal Co., Trinidad.....		W. O. Sherman. Natural	.....		.....

LAS ANIMAS COUNTY—Concluded

Name of Mine	Name and Address of Operators	Pres. or Gen'l. Mgr.	Local Superintendent	Mode of Ventilation	Connections	Railroad	Remarks
Rival (Amador).....	Amador Fuel Co., Aguilar.....		John Allen.....				Reopened
Star.....	Star Mining Co., Cedarhurst.....		L. R. Foster.....	Natural.....			New
Congo.....	Congo Coal Co., Aguilar.....						Closed

LA PLATA COUNTY

Name of Mine	Name and Address of Operators	Pres. or Gen'l. Mgr.	Local Superintendent	Mode of Ventilation	Connections	Railroad	Remarks
Perlin's Peak.....	Calumet Fuel Co., Durango.....		L. McCormick.....	Fan.....	R. G. S.		.....
Hesperus.....	Porter Fuel Co., Durango.....		W. I. Gifford.....	Fan.....	R. G. S.		.....
San Juan.....	Carbon Coal & Coke Co., Denver.....		F. C. Gilbert.....	Furnace.....	R. G. S.		.....
City.....	Royal Coal & Coke Co., Durango.....		Geo. C. Logan..	Natural.....	D. & R. G.		.....

MESA COUNTY

Name of Mine	Name and Address of Operators	Pres. or Gen'l. Mgr.	Local Superintendent	Mode of Ventilation	Railroad Connections	Remarks
Cameo	Grand Jct. Mining & Fuel Co., Denver.	John McNeil	John McNeil, Jr.....	Fan	D. & R. G.	.....
Book Cliff	Book Cliff R. R. Co., Grand Junction..		T. E. Sanford...	Natural	Book Cliff	.....
Palisade	Palisade Coal & Supply Co., Palisade...		Fred Rowley....	Natural	C. M. & D. & R. G.	.....
Grand View	F. F. De Rush, Palisade.....		F. F. De Rush..	Natural	C., M. & D. & R. G.	.....
Garfield	Garfield Coal M. Co., Grand Junction.		A. E. Baylis....	Natural	.....	.....
P. V.	P. V. Coal Co., Cameo.....		F. J. Kerr.....	Natural	C. M. & D. R. Co.	.....
Stokes	W. D. Stokes, Palisade.....		Walter Stokes...	Natural	.....	.....
Farmers	Riverside Fuel & Power Co., Palisade.		Dan T. Lloyd...	Furnace	.....	.....

MONTEZUMA COUNTY

Name of Mine	Name and Address of Operators	Pres. or Gen'l. Mgr.	Local Superintendent	Mode of Ventilation	Railroad Connections	Remarks
Spencer.....	Mancos Fuel Co., Mancos.....		.....	Natural	.....	.....

PITKIN COUNTY

Name of Mine	Name and Address of Operators	Pres. or Gen'l. Mgr.	Local Superintendent	Mode of Ventilation	Railroad Connections	Remarks
Spring Gulch	Colorado Fuel & Iron, Pueblo.....	E. H. Weitzel	Richard Maloy	Fan	C. M.	.....

RIO BLANCO COUNTY

Name of Mine	Name and Address of Operators	Pres. or Gen'l. Mgr.	Superintendent	Mode of Ventilation	Connections	Railroad	Remarks
Leon Canor	Montgomery L. & Cattle Co., Meeker.		N. S. Babcock.	Natural			

ROUTT COUNTY

Name of Mine	Name and Address of Operators	Pres. or Gen'l. Mgr.	Superintendent	Mode of Ventilation	Connections	Railroad	Remarks
Oak Hills No. 1.	Moffat Coal Co., Denver.	S. M. Perry	D. W. Jones.	.....	Fan	D. N. W. & P.	.....
Oak Hills No. 2.	Moffat Coal Co., Denver.	S. M. Perry	D. W. Jones.	.....	Furnace	D. N. W. & P.	New
Plinnacle	.....	.....	E. L. Prentiss, Pres.	.....	Fan	D. N. W. & P.	.....
Yampa Valley No. 1.	Yampa Valley Coal Co., Denver.	.....	R. C. Jones.	.....	.....	D. N. W. & P.	.....
Yampa Valley No. 2.	Yampa Valley Coal Co., Denver.	.....	R. C. Jones.	.....	.....	.....	New
Juniper	.....	.....	Jas. Matthews	.....	.....	D. N. W. & P.	Closed
Electric	.....	.....	.....	.....	.....	D. N. W. & P.	Closed
No. One	.....	.....	W. G. Schnessler, Oak Creek.	.....	.....	.....	Closed

WELD COUNTY

Name of Mine	Name and Address of Operators	Pres. or Gen'l. Mgr.	Local		Mode of	Railroad	Remarks
			Superintendent	Ventilation			
Puritan	National Fuel Co., Denver	H. Van Mater	John Webb	.....	Fan	U. P.	.....
Parkdale	National Fuel Co., Denver	H. Van Mater	James Etchells	.....	Fan	B. & M.	.....
Golden Ash	Consolidated C. & Coke Co., Denver	C. L. Baum	C. W. Smith	.....	Fan	U. P.	.....
Frederick	Frederick Coal Co., Frederick	D. M. Simpson	Geo. White	.....	Fan	U. P.	.....
Evans	American Fuel Co., Denver	D. E. Evans	Will Fox	.....	Fan	U. P.	.....
Ideal	Ideal Coal Co., Erie	Phineas Woolley	.....	.....	Fan	.....	.....
Shamrock	Shamrock Coal Co., Erie	.....	Thos. P. Morgan	.....	Fan	U. P.	.....
Firestone	Louisville Coal & Land Co., Firestone	.....	.....	.....	Fan	.....	.....
Alpha	Alpha Coal Co., Denver	.....	W. H. Brown	.....	Fan	D. L. & N. W.	New
Andrew	State Coal Co., Erie	.....	D. L. Jones	.....	Natural	.....	.....
Warwick	Rocky Mountain Fuel Co., Denver	E. E. Shumway, Pres.	.....	.....	.....	U. P.	Closed
Washington	David Brimble, Erie	.....	.....	.....	.....	U. P.	Idle

INDEX

	Page
Personnel of the State Coal Mining Department.....	2
Letter of transmittal.....	3
Summary of the Coal Production of Colorado in 1911-1912.....	4
Introduction	5-9
Compressor for applying stone or adobe dust (Ill. 1 and 2).....	facing 7
Address to the 19th General Assembly.....	9-10
Letters to operators of Southern Colorado operating south of Aguilar.....	10-11
Letter to W. J. Murray, Vice-President Victor-American Fuel Co.....	12
Letter to operators of the State of Colorado.....	12
Table 1. Showing by companies total production and number of men employed for each fatal and non-fatal accident for the year 1911...	13-14
Table 2. Number of fatal accidents in 1911, causes and percentage.....	15
Table 3. Number of non-fatal accidents in and around mines in 1911, causes and percentage—classification.....	15
Table 4. Showing by companies number of men employed, number killed, number injured per thousand employed, 1911.....	16-17
Table 5. Tonnage by companies per fatal and non-fatal accident, 1911.....	18-19
Table 6. Fatal accident rate per thousand employed and number of lives lost per million tons of coal mined in North America by States and Provinces, 1866 to 1908.....	20-21
State of Colorado—Lives lost per thousand employed, 1909, 1910, 1911 and 1912.....	21
Table 7. Fatal accidents in 1911, underground.....	22-25
Fatal accidents in 1911, surface.....	25
Report on Cokedale Explosion.....	26-30
Improvements in 1911.....	31-37
Table 8. Production of Boulder county, 1911.....	38-39
Table 9. Production of Delta county.....	39
Table 10. Production of El Paso county.....	40
Table 11. Production of Fremont county.....	41
Table 12. Production of Garfield county.....	42
Table 13. Production of Gunnison county.....	43
Table 14. Production of Huerfano county.....	44-45
Table 15. Production of Jackson county.....	46
Table 16. Production of Jefferson county.....	46
Table 17. Production of Las Animas county.....	47-49
Table 18. Production of La Plata county.....	50
Table 19. Production of Mesa county.....	51
Table 20. Production of Montezuma county.....	52
Table 21. Production of Pitkin county.....	52
Table 22. Production of Rio Blanco county.....	53
Table 23. Production of Routt county.....	54
Table 24. Production of Weld county.....	55
Table 25. Coke production by companies and counties, 1911.....	56
Table 26. Production by counties for 1911 and 1912, showing increase and decrease	57
Table 27. Showing by companies total production and number of men employed for each fatal and non-fatal accident for 1912.....	58-63
Table 28. Production by companies, fatal and non-fatal accidents, 1912.....	64-65

	Page
Table 29. Showing by companies number killed and injured per thousand employed	66-67
Table 30. Number of fatal accidents in 1912, causes and percentage.....	68
Table 31. Number of non-fatal accidents in and around the mines in 1912, causes and percentage.....	68
Table 32. Fatal accidents in 1912, underground and surface.....	69-73
Report on the Hastings Explosion.....	74-82
Report on the Piedmont Explosion.....	83-84
The South Canon Explosion.....	85
Mine fires, Simpson and Monarch No. 1 mines.....	86
Improvements in 1912.....	87-95
Brief description of new mines.....	96
Table 33. Production of Boulder county, 1912.....	97-98
Table 34. Production of Delta county.....	99
Table 35. Production of El Paso county.....	100
Table 36. Production of Fremont county.....	101
Table 37. Production of Garfield county.....	102
Table 38. Production of Gunnison county.....	103
Table 39. Production of Huerfano county.....	104-105
Table 40. Production of Jackson county.....	106
Table 41. Production of Jefferson county.....	106
Table 42. Production of Las Animas county.....	107-109
Table 43. Production of La Plata county.....	110
Table 44. Production of Mesa county.....	111
Table 45. Production of Pitkin county.....	112
Table 46. Production of Routt county.....	113
Table 47. Production of Weld county.....	114
Table 48. Coke production, 1912, by companies and counties.....	115
Table 49. Summary of the coal production of Colorado from 1873 to 1912.....	115
Table 50. Number of tons of coal produced in coal mines of the United States, 1814 to 1908, and of Canada, 1874 to 1908.....	116-117
Readings of Relative Humidity.....	117-121
Radiator (Illustration No. 3).....	facing 117
Directory of coal mines.....	124-135

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